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ABSTRACT

The mathematics curriculum provides a framework of instruction for exceptional child education in grades K-12. Content areas include: numeration, whole numbers, rational numbers, real/complex numbers, calculator literacy, measurement, geometry, statistics, functions/relations, computer literacy, and pre-algebra. The guide is organized by content area, and within each content area, behavioral objectives are listed in sequential order by increasing complexity. Major steps in the task analysis of each objective are listed, along with learning activities and resource materials. Materials are coded for the appropriate grade level--elementary, middle school, or high school--and teacher materials are also listed. In a section titled "Essential Skills," major learning objectives are outlined by grade level. A list of books, duplicating masters, kits, games, manipulatives, cards, software, and workbooks is included. The guide also presents the Jefferson County (Kentucky) public schools philosophy, the board of education goals, and the exceptional child education philosophy and goals. (JDD)

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EXCEPTIONAL CHILD EDUCATION CURRICULUM K-12: MATHEMATICS

1986

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EXCEPTIONAL CHILD EDUCATION CURRICULUM K-12: MATHEMATICS

1986

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Superintendent

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EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER
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SUPERINTENDENT'S MESSAGE

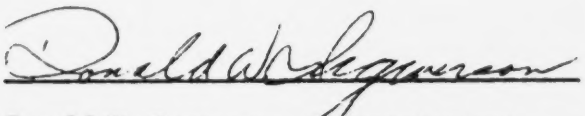
The Jefferson County Public Schools district strives with commitment to support all its students in their individual quest for excellence.

Four interrelated statements provide guidance and support to the district's staff in their efforts to achieve this worthy goal. These statements include the Jefferson County Public Schools Philosophy of Education, which promotes self-development in a free society; the Board of Education Goals, which encompass the community's educational values; the district's Program of Studies and curricular documents, which provide a common instructional focus; and the School-Based Annual Plans, which provide building-level commitments of human and material resources.

Achieving educational excellence requires a dynamic curriculum development process characterized by constant adjustment and change. This process involves a carefully planned and controlled cycle of assessment, development, and evaluation. To this end, the Department of Curriculum and Instruction has utilized assessment data, including professional staff opinion, community input, and results from the district's testing program to design guidelines for curricular documents used in the Jefferson County Public Schools.

While addressing achievement and mastery of specific skills and providing frameworks for district-wide instructional programs, these materials also provide considerable flexibility to local school staffs. These professionals know best how to teach, adapt, and enrich the curriculum as they work closely with their students.

Ultimately, the purpose of this document is to expand opportunities for school staffs to exercise their creativity and commitment in producing excellence among our students.



Donald W. Ingwerson, Superintendent
Jefferson County Public Schools

TABLE OF CONTENTS

Acknowledgments vii

Jefferson County Public Schools Philosophy ix

Board of Education Goals xi

Philosophy and Goals xiii

Purpose and Use of the Guide xv

Scope and Sequence xvii

Objectives 3

Strands:
- Numeration 10
- Whole Numbers 38
- Rational Numbers 74
- Real/Complex Numbers 120
- Calculator Literacy 128
- Measurement 132
- Geometry 170
- Statistics 182
- Functions/Relations 196
- Computer Literacy 200
- Pre-Algebra 206

Essential Skills 217

Appendix: Vendors' Addresses 233

Resources 235

Citizen's Request for Review and Reevaluation of Instructional Materials
Request for Reconsideration of Instructional Materials

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JEFFERSON COUNTY PUBLIC SCHOOLS PHILOSOPHY

WE BELIEVE . . .

That each person is of worth, is endowed with human dignity, is unique, and is entitled to respect as an individual.

That self-realization, self-discipline, quality in human relationships, and appreciation for one's cultural heritage are essential to the full development of the individual.

That the contributions of our diverse backgrounds--racial, ethnic, religious, social, economic, and political--are essential to the strength and richness of our society.

That the correlation of these backgrounds in our school system, both in curriculum and in practice, is necessary and essential to quality education.

That the freedoms guaranteed by the Constitution of the United States and by the Bill of Rights are essential to a democratic society and that all persons need to understand both the privileges and the responsibilities of citizenship.

That since we live in a changing world, all persons need to be prepared to meet, evaluate, and adjust to change creatively and intelligently.

That effective education comes from a responsible and mutual effort on the part of the school, the church, the family, and the community-at-large. This includes sharing in the determination of goals and in providing necessary resources.

That the school, student, family, and the community-at-large need to realize the significant role played by the other in the educative process.

That the public school is a fundamental part of our tradition and has a responsibility to the individual and the society in which we live.

WE BELIEVE THAT IT IS THE GOAL OF OUR SCHOOLS . . .

To provide education at the earliest appropriate age and to seek and identify the needs of each individual student on a continuing basis.

To provide the necessary tools and incentives to assure each student the highest quality of education.

To provide the necessary programs, training, and qualified and supportive personnel to motivate all students to achieve according to their individual learning patterns and rates of growth in order to realize their maximum potentials intellectually, economically, socially, culturally, and physically.

To provide a climate wherein the uniqueness of the cultures that each individual brings to the classroom setting is positively received.

To provide the structures, policies, and practices that reflect the multi-ethnic nature of our community through the composition of administrative staff, faculties, and student bodies.

WE BELIEVE . . .

That the philosophy of education of the Jefferson County Public Schools must be regularly reevaluated by the schools, students, parents, and the community-at-large.

BOARD OF EDUCATION GOALS

1. To create, in an integrated school system, an atmosphere that nurtures intellectual growth and development and encourages creativity, critical thinking, and love of learning in both students and teachers.

2. To offer the opportunity for each student to develop a sound mastery in basic skills and for these skills to be measured on a regular and constructive basis to ensure progress and success.

3. To encourage talents of both faculty and administrators through a climate of mutual trust, confidence, clear expectations and evaluation criteria, and conscious recognition of outstanding instructional leadership and performance.

4. To inform both public and private sectors of this community of the academic, vocational, and special programs of the Jefferson County Public Schools through an intensive public relations effort and to impress upon the community, especially parents, the importance of their part in the education of our children.

5. To budget the financial resources of the district to meet the instructional needs of all students and to maintain and improve campus facilities to further enhance and support student needs.

PHILOSOPHY AND GOALS

Exceptional Child Education (ECE) Programs are designed to meet the needs of students whose approach to learning is different from that of their peers. The Jefferson County Public Schools is committed to providing a high quality education for handicapped students. ECE students follow the curriculum of the general education program, as appropriate, using special instructional techniques and materials as necessary. The ECE curriculum parallels many areas of the general education curriculum, emphasizing certain skills and adding others to meet the needs of the exceptional learner. ECE Programs concentrate on the development of those basic academic and daily living skills which will be needed for future employment and independent adult living.

PURPOSE AND USE OF THE GUIDE

The purpose of the Exceptional Child Education curriculum is to facilitate teaching, and, therefore, learning by providing a base level of information to be taught. The curriculum guides provide a framework of instruction for the exceptional learner. Each learner's specific needs should determine the curricular strands needed for successful progress. Activities, materials, and resources suggested to teach the steps of each objective are provided, but neither they, nor the objectives themselves, are intended to be the total learning experience for any student. Rather, the guide should be viewed as a point of origin for instruction with embellishments and refinements to be added by each Exceptional Child Education teacher. It is expected that Exceptional Child Education teachers will use the information within this guide to provide a consistent district-wide structure for teaching students with special needs. However, each teacher's unique instructional style and the documented needs of students will contribute to the creation of a total environment conducive to learning.

The sequence in which skills are addressed and the amount of time devoted to an area will vary according to the needs of individual students and the goals established on their Individual Education Programs. Whenever possible, however, it is recommended that units of study follow the general scope and sequence of the regular program. Teachers are also strongly encouraged to use general education curriculum guides as instructional resource material.

Each subject within the Exceptional Child Education curriculum has been arranged in a format comparable to the subjects in the general education curriculum. Identifying phrases listing the subject, strand, and learning head each page. Vocabulary words are listed, usually on each page. Major objectives proceed down the left side of the page, usually in sequential order. Major steps in the task analysis of each objective are listed in the center of the page, while activities, materials and resources for each step (or in some cases, for each objective) are aligned on the right side of each page.

Major objectives are keyed to the general education curriculum by denoting the grade levels at which these skills are introduced (I), mastered (M), reinforced (R), or tested (#). Some objectives are also keyed to assessment instruments such as the Brigance Diagnostic Inventory of Essential Skills or the KeyMath Diagnostic Arithmetic Test. Grade levels are recommended for student materials: E = Elementary School, M = Middle School, and H = High School. Teacher materials are coded as T; teacher materials appropriate to only certain age students are coded, e.g., T-E, M.

Scope

The scope of the ECE Curriculum K-12: Mathematics parallels most of the strands found in the JCPS Continuous Progress Program Mathematics (CPP). The following strands are incorporated into this guide:

- Numeration
- Whole Numbers
- Rational Numbers
- Real/Complex Numbers
- Calculator Literacy
- Measurement
- Geometry
- Statistics
- Functions/Relations
- Computer Literacy
- Pre-Algebra

Only the Pre-Algebra and Calculator usagewill not be found in the CPP. The high degree of correlation between the CPP and this ECE guide is understandable since mathematics knowledge is a constant; it does not vary with the charac- teristics of the learner. With the district's thrust to mainstream ECE students into general education settings, ECE and general education teachers will appreciate the value of having curriculum guides in mathematics which are similarly organized by content and format. Where there are differences, they occur because of the unique learning needs of ECE students, many of whom are being instructed in special class settings rather than in general education settings. For example, the Calculator strand highlights the role of computation aids in daily living. For many ECE students, use of calculators requires that they follow a sequenced set of instructional objectives before they can use the device functionally.

Sequence

The strands and learnings are sequenced in a fashion consistent with the general education Continuous Progress Program (CPP) for mathematics. The parallel between the ECE mathematics strand and learnings with the CPP should facilitate the mainstreaming process for ECE students. Another important aspect of this parallel arrangement is that this ECE guide should enable general education mathematics teachers to modify the content or teaching strategies to meet the needs of at-risk students who are not eligible for special education placement but who, nevertheless, need remediation in certain mathematical learnings and/or more intensive practice to obtain mastery of specific skills.

The objectives under each learning are sequenced by increasing complexity. This arrangement was determined based upon the probable acquisition of skills manifested by ECE students with cognitive, perceptual and language deficits; the order found in the CPP; and the hierarchical arrangement found in the ECE adopted mathematics textbook series for K-8, Harcourt Brace Jovanovich Mathematics (1981) and Media Materials high school adopted texts: Basic Mathematics Skills (9th grade), Life Skills Mathematics (10th grade), and Mathematics for Consumers (11th grade).

Learning objectives have also been correlated with items found in commonly used norm referenced tests such as the Peabody Individual Achievement Test (PIAT) and the KeyMath Diagnostic Arithmetic Test (KM). The Kentucky Essential Skills Test (KY) objectives through grade 8 have been appended for easy reference. In the materials column, correlations with the adopted ECE textbooks can be located.

ECE CURRICULUM K-12: MATHEMATICS

OBJECTIVES

Counts to 1000 by ones. M01001 (KY)

Counts to 120 by given multiples. M03001 (KY)

Counts backward by ones from 120.

Counts up to 100 objects. M00001, M00002, M01002 (KY)

Counts up to 100 objects by 2's.

Estimates the number of objects up to 100.

Sorts objects into sets. M00004, M00005, M01006, M08012 (KY)

Describes characteristics of a set.

Illustrates relationships among sets. M00003 (KY)

Reads whole numerals and number words to 1000. M01015 (KY)

Reads whole numerals and number words to millions. M03012, M05004, M05005 (KY)

Writes whole numerals and number words to 1000. M01010, M02002, M06004 (KY)

Selects word name for decimal numbers through ten thousandths place. M08005 (KY)

Identifies word names for all rational numbers (whole numbers, negative numbers, functions, and decimals).

Identifies the number which corresponds to a point on a number line 1 to 100. M01008, M02001 (KY)

Identifies a point on a number line relating to a given fraction. M05016 (KY)

Orders a set of integers on a number line. M07005 (KY)

Identifies place value of tens and ones.

Identifies place value in a numeral up to nine digits. M03008, M05021 (KY)

Identifies decimal place value to the thousandths.

Identifies first through fifth positions.

Names sixth through tenth positions.

Names eleventh through thirtieth positions. M03007 (KY)

Reads Roman numerals I through XII.

Names common uses of Roman numerals.

Writes Hindu-Arabic numerals for Roman numerals through M (1000).

Lists factors of a given number less than 100.

Finds greatest common factor of two numbers.

Writes a composite number less than 100 as the product of its prime factors. M07002, M07003 (KY)

Locates objects according to their positions in space. M00006, M00007 (KY)

Arranges numerals in order, 0-999. M04019, M07001 (KY)

Identifies numbers before, after, and between 1-999. M04019, M07001 (KY)

Identifies numbers before, after, and between 1-999. M04019, M07001 (KY)

Illustrates a number sentence.

Selects the number sentence appropriate to solving problems using the four basic operations.

Writes a number sentence for a verbal problem.

Writes a number sentence for a verbal problem.

Identifies a given number as odd or even.

Demonstrates an understanding of zero as an empty set in mathematical operations. M02002 (KY)

Uses symbols to indicate greater than (>) and less than (<). M02006, M04017 (KY)

Identifies total number of objects in separate groups.

Names the sums for basic addition facts through 18. M01003, M02003 (KY)

Names the sums for basic addition facts through 18. M01003, M02003 (KY)

Adds six-digit numbers requiring renaming. M02015, M03001, M04001, M06007 (KY)

Manipulates sets of objects by removing a set from another and identifying the remaining set.

Identifies subtraction as the inverse operation of addition.

Names differences for basic subtraction facts through 18. M01004 (KY)

Names differences for basic subtraction facts through 18. M01004 (KY)

Subtracts six-digit numbers requiring renaming. M02016, M03003, M04002, M06008 (KY)

Uses sets to show meaning of multiplication.

Names products for basic multiplication facts through 9 x 9. M03004 (KY)

Names products for basic multiplication facts through 9 x 9. M03004 (KY)

Computes product of two numbers with three digits each. M04003, M06008 (KY)

Separates objects into equal sets.

Names the quotients for basic division facts through 81 ÷ 9.

Finds the quotient of a five-digit number divided by a two-digit number. M04004, M06008 (KY)

Solves oral word problems using sets of objects, pictures or diagrams. M01003, M01004, M06001, M06002, M08014, M08015 (KY)

Solves two-step word problems involving addition, subtraction, multiplication and division. M02005, M03002, M03003, M03004, M04008, M06008, M04020 (KY)

Estimate sums, differences, products and quotients using reasonableness of answer. M05001, M05002, M06003, M04021 (KY)

Demonstrates an understanding that a whole can be divided into equal parts. M03012, M04003, M05006 (KY)

Changes ratios to fractions. M04003 (KY)

Simplifies fractions to their lowest terms. M05007 (KY)

Changes improper fractions to mixed numbers. M06005 (KY)

Uses symbols to indicate greater than (>) and less than (<) in number sentences involving fractions. M04013, M07007 (KY)

Explains function of a decimal point.

Changes decimals to equivalent common fractions. M08003 (KY)

Rounds decimal numbers to nearest hundredths. M05017, M08016 (KY)

Uses symbols to indicate greater than (>) and less than (<) in number sentences involving decimals. M05018, M07009 (KY)

Changes equivalent percents to common fractions. M06006, M07021, M08003 (KY)

Changes decimals to percents. M06006, M08003 (KY)

Applies use of fractions, ratios, decimals, and percents to everyday living. M08004 (KY)

Adds common fractions with like and unlike denominators. M05008 (KY)

Adds decimal numbers. M05022 (KY)

Adds mixed numbers with unlike denominators. M06020 (KY)

Subtracts common fractions with like and unlike denominators. M05009, M06020 (KY)

Subtracts decimal numbers. M06007 (KY)

Subtracts mixed numbers with unlike denominators. M06020 (KY)

Multiplies a simple fraction by a simple fraction. M06020, M07008 (KY)

Computes the product of decimal numbers. M05023, M06007, M07010 (KY)

Computes the product of decimal numbers. M05023, M06007, M07010 (KY)

Multiplies a simple fraction by a whole number. M06020, M07008 (KY)

Multiplies a whole number by a mixed number. M07008 (KY)

Multiplies a simple fraction by a mixed number. M07008 (KY)

Multiplies a mixed number by a mixed number. M07008 (KY)

Divides a simple fraction by a simple fraction. M07008 (KY)

Divides a decimal number by a decimal number. M07020 (KY)

Divides a mixed number by a mixed number. M07008 (KY)

Solves oral word problems using fractional parts of objects, models or pictures.

Solves word problems involving rational numbers. M06008 (KY)

Uses estimation skills to recognize reasonableness of results. M08017 (KY)

Writes an equivalent whole number for an exponential expression. M07006 (KY)

Writes the exponents for powers of ten.

Uses the order of operations to simplify a numerical expression using whole numbers. M08001 (KY)

Writes numbers in scientific notation.

Operates keys for "on," "off," "clear," and "cancel".

Operates keys to perform four basic mathematical operations.

Operates memory function.

Names the value of individual coins and bills to $10. M01005, M03005, M04011 (KY)

Makes correct change up to $20.00. M06017 (KY)

Makes correct change up to $20.00. M06017 (KY)

Counts change accurately.

Names days of week in order. M00010 (KY)

Locates date on the calendar. M03014 (KY)

Explains relationships among days, weeks, months, seasons, and years.

Relates specific times to specific activities. M00008 (KY)

Equates the relationships of time.

Tell time to the minute using a traditional and a digital clock. M01013, M02014, M03006 (KY)

Tells future and past time. M06017 (KY)

Estimates time that will be needed to complete an activity.

Tells purpose of a thermometer.

Describes applications of thermometers in daily living. M05012, M05013 (KY)

Reads thermometers in degrees. M05015 (KY)

Measures liquid in English units.

Converts units of volume measurement within the metric system.

Converts units of volume measurement within the metric system.

Solves problems involving capacity/ volume. M06014, M09010, M01012 (KY)

Solves problems involving capacity/ volume. M06014, M09010, M01012 (KY)

Measure length in English Units. M01011, M06013, M02009, M06009, M03009, M06010, M04008, M03011, M05019, M06012 (KY)

Converts units of linear measurement within the metric system. M07014 (KY)

Determines the perimeter of a polygon. M04014, M06019, M09009 (KY)

Finds circumference of a circle. M08006 (KY)

Relates a given area to squares on a grid. M05010 (KY)

Determines the area of a simple polygon. M04015, M06021, M08007 (KY)

Determines the area of a simple polygon. M04015, M06021, M08007 (KY)

Determines the area of a circle. M08007 (KY)

Measures weight in English units.

Converts units of weight measurement within the metric system. M07014 (KY)

Converts units of weight measurement within the metric system. M07014 (KY)

Estimates weight of a given object. M05011, M06015, M06016 (KY)

Determines relative positions of two or more objects or figures. M00006, 02008, M04006 (KY)

Determines relationships of two or more objects or figures. M00009, M02007, M04007, M07012, M07013 (KY)

Identifies symmetry. M04018 (KY)

Describes plane geometric shapes. M01013, M02017, M06011 (KY)

Describes characteristics of basic geometric solids. M05003 (KY)

Constructs solid geometric figures.

Identifies right angle. M04006 (KY)

Identifies isoceles and obtuse angles. M04007 (KY)

Draws angles with a protractor. M07022 (KY)

Reads simple graphs. M04012, M07016 (KY)

Constructs simple graphs. M07016 (KY)

Interprets results from graphed information. M05025, M07015 (KY)

Calculates average (mean). M04016, M08009 (KY)

Calculates medians and modes. M08009, M08010 (KY)

Selects appropriate measure of central tendency to match given situations.

Predicts an outcome. M11012 (KY)

Writes a fraction expressing the probability that an event will happen. M08011 (KY)

Computes probability of single events using a simple counting procedure.

Writes the ordered pair of numbers of a given point, using Quadrant I of a coordinate graph. M05024 (KY)

Graphs simple equations on Quadrant I. M08013 (KY)

Graphs simple equation on the Cartesian Plane. M08008 (KY)

Identifies parts of a computer.

Identifies uses of computers in daily living.

Identifies manufactured computer-related products.

Runs a pre-programmed program on the computer.

Uses Turtle graphics to make rotations.

Uses LOGO to solve problems.

Locates positve and negative numbers on a number line. M07004, M07017, M07018, M07019, M07005 (KY)

Computes integers with like signs. M08002 (KY)

Computes integers with unlike signs. M08002 (KY)

Solves an equation of this format and proves: $x - 2 = 4$.

Solves an equation of this format and proves: $2x + 4 = 16$.

Formulates the equation for a given word problem.

STRAND Numeration

LEARNING Rote Counting

CRITICAL ATTRIBUTE:

VOCABULARY: estimate

OBJECTIVE	TASK ANALYSIS
Counts to 1000 by ones. (1:M) M01001 (KY) KM A Numeration 4, 5, 7-10, 12 PIAT 1 Math 10	1. Counts to 10 by 1's. 2. Counts t0 20 by 1's. 3. Counts to 100 by 1's. 4. Counts to 200 by 1's. 5. Counts to 300 by 1's. 6. Counts to 400 by 1's. 7. Counts to 500 by 1's. 8. Counts to 700 by 1's. 9. Counts to 1000 by 1's.
Counts to 120 by given multiples. 2:I (for 2, 5, 10) 3:I (for 3, 4) 4:I (for 6, 7, 8, 9) 5:M M03001 (KY) PIAT 1 Math 37	1. Counts forward by intervals of 10 to 120. M01007 (KY) 2. Counts to 120 by 5's. M02012 (KY) 3. Counts to 120 by 2's. M01009 (KY)
Counts backward by ones from 120. KM A Numeration 18	1. Counts forward by 1's to 120. 2. Counts backwards from 120 starting with intervals of 10 decreasing to 5's, 2's, and 1's.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Model counting; have students imitate.	May, Lola J., et al. HBJ Mathematics 3, TE, pp. 35-41, 45-57.
Model counting; have students imitate.	
Model counting; have students imitate.	

STRAND Numeration

LEARNING Counting Objects

CRITICAL ATTRIBUTE:

VOCABULARY: estimate

OBJECTIVE	TASK ANALYSIS
Counts up to 100 objects. (1:M) M00001 (KY) M00002 (KY) M01002 (KY) KM A Numeration 4, 5, 7-10, 12	1. Counts set of 10 objects. 2. Continues counting sets of objects by 1's up to 100 objects. 3. Matches sets with numbers, not to exceed 20.
Counts up to 100 objects by 2's.	1. Counts objects by 2's to 10. 2. Continues counting objects by 2's up to 100 objects.
Estimates the number of objects up to 100. (1:I; 2-5:R)	1. Estimates the number of objects up to 10. 2. Estimates the number of objects up to 25. 3. Estimates the number of objects up to 100.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Model counting; have students imitate.	Age-appropriate daily living items or manipulatives (E, M, H) HBJ Mathematics 1, TE, p. 167. HBJ Mathematics 2, TE, pp. 164-168, 252. HBJ Mathematics 3, TE, p. 32.
Model counting; have students imitate.	Age-appropriate manipulatives (E, M, H) HBJ-1, TE, pp. 169-170. HBJ-2, TE, pp. 167-168. HBJ-3, TE, p. 140.
Provide two groups of objects; ask students to select group nearer to 10. Have students take turns setting up groups of objects and estimating the group closest to 25.	Age-appropriate daily living items (E, M, H)
Have students estimate number of objects in a jar or box.	Jar of jelly beans, beans, or cookies (E, M, H)
Have students estimate number of people in a room or in a picture.	Age-appropriate pictures (E, M, H) Software: San Diego Basic Skills in Math, Vol. I: Objective 2. (E)

STRAND Numeration

LEARNING Sets

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Sorts objects into sets. (K:I; 1-6:R) M00004 (KY) M00005 (KY) M01006 (KY) M08012 (KY) KM G Division 1, 2 KM J Word Problems 5 PIAT 1 Math 31	1. Sorts three objects on the basis of one attribute. 2. Arranges objects in order of size from smallest to largest. 3. Sorts a dozen objects into two sets on the basis of one attribute. 4. Sorts objects into sets according to more than one attribute. 5. Uses logical quantifiers (all, none, some) correctly.
Describes characteristics of a set. KM A Numeration 2	1. Describes a set on basis of attributes of size, color, or shape. 2. Describes a set of objects on basis of two attributes.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Demonstrate sorting common household items according to one attribute.	Age-appropriate manipulatives (E, M, H) HBJ-K, TE, pp. 11-24. HBJ-1, TE, pp. 2-6.
Have students name smallest to largest items in a room.	Attribute Games and Problems (E, M) Cuisenaire Rods (E, M, H) Lotto picture cards (E)
Have students compare items in a magazine/newspaper on the basis of a given attribute.	Age-appropriate magazines
Compare individual people and groups according to 2 given attributes, e.g., sex and hair color, or age and race. Example: Make a group of brown-haired males and black-haired females; brown-haired females could not be assigned to either group.	Teachers and students; pictures from magazines or out-of-use texts
Ask students to select an attribute and then identify objects to match the attribute. Ask students to select two attributes and then identify objects or pictures to match given attributes.	KeyMath Early Steps. (E) HBJ-K, TE, pp. 11-24. HBJ-1, TE, pp. 2-6. KeyMath Attribute Block. (E) KeyMath Card Decks. (E)

STRAND Numeration

LEARNING Sets

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Illustrates relationships among sets. (1:I; 3-5:R; 8:M) M00003 (KY) KM J Word Problems 5 PIAT-9	1. Identifies sets with different attributes. 2. Combines sets of objects. 3. Determines numbers in sets by grouping. 4. Illustrates intersecting sets. 5. Determines which one of two sets is larger, smaller, or the same as another set.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use string and objects to show two sets with different attributes. Ask students to encircle two sets of objects into one large set and describe it, e.g., two circles and three circles equal five circles; one banana and three apples make four pieces of fruit. Request students to encircle even numbers, odd numbers, or other specified numbers in a set. Direct students to encircle objects from different sets that share a common attribute.	Sets of age-appropriate objects of varying colors, shapes and sizes; shoestring or yarn
Direct students to identify the larger or smaller of two sets. First use the students themselves to make up the sets (e.g., boys and girls, glasses and no glasses) then continue with sets of objects and sets of symbols.	HBJ-1, pp. 5, 6.

STRAND Numeration

LEARNING Numerals and Number Words

CRITICAL ATTRIBUTE:

VOCABULARY: numeral

OBJECTIVE	TASK ANALYSIS
Reads whole numerals and number words to 1000. (K:I; 3:M) M01015 (KY) KM A Numeration 3 PIAT-12	1. Reads numerals and number words to 10. 2. Reads numerals and number words to 20. 3. Reads numerals and number words to 100. 4. Reads numerals and number words to 1000.
Reads whole numerals and number words to millions. (5:M) M03012 (KY) M05004 (KY) M05005 (KY) PT 5	1. Reads number words and numerals through 100,000. 2. Copies numerals and number words to one hundred thousand. 3. Reads any number through a hundred million. 4. Copies numerals and number words to millions. 5. Matches a number to a corresponding word name.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Ask the students to match number words to numerals. Provide flash cards for students to read.	Ryder, Ruth, et al. Pacemaker, Level B. Belmont, CA: David S. Lake Pubs., 1971-74. (E, M, H) (except TMH) Flash cards (0-1000)
Have students match number words to numerals to groups or pictures of groups of objects.	Assortment of age appropriate objects (E, M, H)
Have a number bee; divide the class into two teams. Each student in turn draws from a hat a paper with a numeral or number word which he/she reads aloud. If the students reads correctly, his/her team scores a point.	Workbook: Ritch, Benjamin. Find the Right Number. Phoenix, NY: Frank Richards Co., 1983. (E, M, H) Bitter, Gary. Getting Ready for Mathematics. DLM, n.d. (E) Math Big Box. DLM, n.d. (E) Show Me Math. Nasco, n.d. (E)
Model reading numerals through 100,000. Say a number aloud; write the numeral or have student write it on the overhead, chalkboard, or wipe off cards. Provide a list of assorted numerals and number words; give a series of oral directions, e.g., "Put a blue star above the numeral 99." Provide flash cards with number words and corresponding numerals. Have students play "Concentration" or "Memory" with them.	Launch: A Handbook of Ideas to Motivate the Teaching of Preschool and Kindergarten. Stevensville, MN: Educational Service, 1972. (E) Plus: A Handbook of Ideas to Motivate the Teaching of Preschool and Kindergarten, 1975. (E) HBJ-1, TE, pp. 7-17, 55-67, 145, 146. HBJ-2, p. 3. HBJ-1, TE, pp. 31-36. HBJ-7, TE, p. 24. HBJ-8, TE, pp. 6-7.

STRAND Numeration

LEARNING Numerals and Number Words

CRITICAL ATTRIBUTE:

VOCABULARY: pattern, sequence

OBJECTIVE	TASK ANALYSIS
Writes whole numerals and number words to 1000. (K:I; 3:M) M01010 (KY) M02002 (KY) M06004 (KY)	1. Writes numerals and number words to 10 (ten). 2. Writes numerals and number words to 20 (twenty). 3. Writes numerals and number words to 100 (hundred). 4. Writes numerals and number word from dictation 0-1000.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Model writing numerals and number words to 10; have students imitate. Show flash cards with numerals (number words) to 20; have students write corresponding number words (numerals). Dictate numbers 0-100; have students write numerals and number words. Give each student a set of flash cards with numerals and numbers. Direct the game "Show Me". (One student dictates a numeral/number word and other students must make that numeral and number word with their cards.)	Software: San Diego Basic Skills in Math, Vol. 2, Objective 14. (E) HBJ-K, TE, pp. 34, 40, 53-54, 59, 90, 96, 108, 113-114. HBJ-1, TE, pp. 8, 10, 12, 14, 16, 18, 56, 58, 59, 62, 66, 68-69, 159-161. HBJ-2, TE, pp. 4, 9-12, 290, 157-164, 166-168. HBJ-3, TE, pp. 35, 41, 45, 47. HBJ-6, TE, p. 43. HBJ-7, pp. 84-86. HBJ-8, pp. 59-60.

STRAND Numeration

LEARNING Numerals and Number Words

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Selects word name for decimal numbers through ten thousandths place. (8:M) M08005 (KY) KM A Numeration 19	Use the TA below for tenths, hundredths, thousandths, and ten thousandths. 1. Locates place value for selected numeral, e.g., tenths. 2. Names place value. 3. Matches numeral to place value. 4. Matches word name to place value. 5. Matches numeral to word name.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Request the students to match corresponding money to places on a chart.	Assorted money Money chart
Have the students to name one place at a time on decimal place value chart and place corresponding money to each place named, as it is named.	Decimal place value chart Construction paper Felt-tip pens
Direct the students to construct own place value chart for decimals.	Construction paper Felt-tip pens
Ask the students to write the names and decimal numerals for each corresponding place.	3 x 5 cards Pen
Play a game of cards (Old Maid format) matching numerals to names.	HBJ-6, pp. 43-44, 46-57. HBJ-7, pp. 59-60. HBJ-8, pp. 84-86. Jacobs, Donald H., and Treff, August. Basic Mathematics Skills. Baltimore, MD: Media Materials, Inc., 1982, pp. 82-88.

STRAND Numeration

LEARNING Numerals and Number Words

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies word names for all rational numbers (whole numbers, negative numbers, functions, and decimals).	1. Reads word names for given rational numbers. 2. Selects word names for given rational numerals. 3. Matches word names to given rational numerals. 4. Writes rational numerals for given word names. 5. Writes word names for given rational numbers/numerals.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide word names for rational numbers on overhead, chalk board, chart, flash cards. Model each name; have students imitate. Using a card game format have students select word name for a specific given rational numeral. Use a concentration board on the overhead and have students match word names to given rational numerals. Use a tape recording of dictated word names. Use a tape recording/flash cards to give rational numbers/numerals.	Place value chart Concentration board 3 x 5 cards Flash cards Overhead Tape recorder Tape

STRAND Numeration

LEARNING Number Line

CRITICAL ATTRIBUTE:

VOCABULARY: number line

OBJECTIVE	TASK ANALYSIS
Identifies the number which corresponds to a point on a number line 1 to 100. M01008 (KY) M02001 (KY)	1. Finds a number 1-10 on a number line. 2. Finds a number 1-50 on a number line.
Identifies a point on a number line relating to a given fraction. M05016 (KY)	1. Identifies on the number line a point corresponding to one-half. 2. Identifies on the number line a point corresponding to one-fourth, one-third, or one-fifth. 3. Identifies on the number line a point corresponding to one-tenth, labeled as a common fraction or a decimal.
Orders a set of integers on a number line. M07005 (KY)	1. Locates any given integer on a number line. 2. Orders two given integers. 3. Orders a set of more than two integers.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Tape a number line to each student's desk. Call out a number and have all students simultaneously point to the number.	Teacher-made or commercial desk-top number lines
Have students play "Show Me" in pairs or small groups. One student names a number, the other finds it on a number line.	
Have students, using standard rulers, find the 1/2 inch marks between each whole inch.	12-inch or 6-inch rulers HBJ-3, pp. 208, 213.
Have students make their own number lines, marking the halfway point between each number.	HBJ-4, p. 190.
Distribute number lines that are marked but not labeled. Have the students label the points that relate to 1/2, 1/4, 1/3, 1/5, and 1/10.	
Model the locating of a positive integer and the corresponding negative integer on a number line.	HBJ-6, p. 324, HBJ-7, pp. 342-343, 345. HBJ-8, pp. 236-237.

STRAND Numeration

LEARNING Place Value

CRITICAL ATTRIBUTE:

VOCABULARY: expanded form

OBJECTIVE	TASK ANALYSIS
Identifies place value of tens and ones. (1:M; 1:#) PIAT 1 Math 48	1. Identifies value of numbers 1-10. 2. Identifies value of zero. 3. Identifies value of numbers 10-90.
Identifies place value in a numeral up to nine digits. (5:I; 5:#; 6:M) M03008 (KY) M05021 (KY) PIAT 1 Math 51	1. Identifies one's, ten's, and hundred's place value. 2. Identifies one-thousand's place value. 3. Identifies each of the remaining place values through 100,000,000.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Model exchanging 10 pennies for a dime; 10 dimes for a dollar. Ask students to exchange 10 white Cuisenaire Rods for 1 orange rod.	Place value board Place value tray Money Pacemaker Arithmetic Program. Levels C and D. (E) Cuisenaire Rods. (E,M) Software: San Diego Basic Skills in Math, Vol. 2, Objectives 15, 16, 17, 18. HBJ-1, TE, pp. 149-162.
Model how to place each digit in the appropriate place on a chart or tray. Model how to write any 4 digit number in expanded form on chalkboard. Model how to place each digit in appropriate place on a chart or tray.	Place value board Place value tray Base 10 materials Chalkboard HBJ-5, TE, pp. 31-35. HBJ-6, TE, pp. 31-36. HBJ-7, TE, p. 24. HBJ-8, TE, pp. 6-7. Place value chart

STRAND Numeration

LEARNING Place Value

CRITICAL ATTRIBUTE:

VOCABULARY: expanded form

OBJECTIVE	TASK ANALYSIS
Identifies decimal place value to the thousandths. (5:I; 5:#; 6:M) KM A Numeration 19, 23	1. Identifies decimal place value to the tenth's place. 2. Identifies decimal place value to hundredths place.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Model naming of place value; have students imitate. Show how dimes and pennies correspond to tenths and hundredth place in money.	Number line Place value chart Calculators Dollars, dimes, and pennies Pacemaker Arithmetic Program. Level E. HBJ-5, TE, pp. 45-47. HBJ-6, TE, pp. 43, 227. HBJ-7, TE, pp. 84-86. HBJ-8, TE, pp. 59-60.

STRAND Numeration

LEARNING Ordinal Numbers

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies first through fifth positions. (K:I) KM A Numeration 13	1. Matches ordinal numbers (first through fifth) to correspond to counting numbers (1-5). 2. Counts first through fifth by rote. 3. Identifies objects in first through fifth positions.
Names sixth through tenth positions. (2:M; 2:#)	1. Matches ordinal numbers to correspond to counting numbers 6-10. 2. Counts sixth through tenth positions.
Names eleventh through thirtieth positions. (3:I; 4-5:R) M03007 (KY)	1. Matches ordinal numbers to corresponding counting numbers 11-30. 2. Counts eleventh through thirtieth positions.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Ask students to match grades in school to years in school using AV materials. Model counting first through fifth; have students imitate. Point to an object and ask student to name its position. Ask students to point to object in a given position in a series.	Overhead, chalkboard HBJ-1, TE, pp. 171-172. HBJ-2, TE, pp. 17-20. HBJ-3, TE, p. 42.
Demonstrate matching ordinal numbers to corresponding numbers 6-10 on chalkboard; have students imitate. Name position 6-10 of objects; have students imitate, then identify each position pointed to.	Age-appropriate manipulatives Pictures in books and magazines Pacemaker Arithmetic Program, Level B. (E, M, H) (except TMH) HBJ-2, TE, pp. 72. HBJ-3, TE, p. 19-20.
Demonstrate matching ordinal numbers to numerals 11-30; have students imitate. Name two positions (e.g., twelfth and twenty-second); ask students to identify which position comes before (or after) one. Provide a list of ordinal numbers (words) in a column down the middle of a page; ask students to write ordinal numbers (words) that precede and follow each example given.	Overhead, chalkboard, flashcards, chart

STRAND Numeration

LEARNING Roman Numerals

CRITICAL ATTRIBUTE:

VOCABULARY: Arabic, Roman

OBJECTIVE	TASK ANALYSIS
Reads Roman numerals I through XII (3:I) KM A Numeration 16 PIAT 1 Math 69	1. Matches Roman numerals I-XII with Arabic numerals 1-12.
Names common uses of Roman numerals.	1. Names specific items used in everyday living that use Roman numerals.
Writes Hindu-Arabic numerals for Roman numerals through M (1000). (4:I; 6-7:R)	1. Matches Roman numerals I, V, X, L, C, D, and M to equivalent Arabic numerals. 2. Identifies any Roman numeral to M. 3. Writes Arabic numerals for given Roman numerals to M. 4. Writes Roman numerals for given Arabic numerals to 1000.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate matching Roman numerals I-XII with Arabic numerals; have students imitate.	Flashcards Desk squares Roman numerals I through M
Play modified Concentration, allowing Roman-Arabic pairs to count as a match.	HBJ-4, TE, p. 229. HBJ-6, TE, p. 45.
Identify parts of a book that use Roman numerals.	
Provide pictures of clock faces, and ask student to select those which use Roman numerals.	Age-appropriate magazines and books Assortment of clocks
Demonstrate use of Roman numerals in outline form for writing a report.	Reports and books with outline format HBJ-4, TE, p. 229.
Have class generate a list of everyday items that have numbers on them (e.g., speed limit signs, book pages, thermometers, telephone dial, license plates, clocks). Identify which use Arabic and which use Roman numerals.	
Provide work sheets and flashcards for matching.	Flashcards Arabic and Roman numerals
Ask students to point to Roman numerals as dictated. Ask student to read Roman numeral flashcards.	Judy/Instructo Staff. Basic Math Skills: Place Value and Roman Numerals. (E)
Provide work sheets with Roman numerals given to M; have students write corresponding Arabic numeral.	HBJ-4, TE, p. 229. HBJ-5, TE, p. 49.
Provide work sheets with given Arabic numbers to 1000.	HBJ-6, p. 45.

STRAND Numeration

LEARNING Factors

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Lists factors of a given number less than 100. (5:R; 6-7:R)	1. Demonstrates the factors of a product. 2. Explains divisibility rules for 2, 5 and 10. 3. Applies divisibility rules to finding factors.
Finds greatest common factor of two numbers. (5:M)	1. Identifies common factors of two given numbers. 2. Identifies greatest common factor of two given numbers.
Writes a composite number less than 100 as the product of its prime factors. (8:R) M07002 (KY) M07003 (KY)	1. Defines a prime number. 2. Uses a factor tree to find prime factorization.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use objects or pictures to prove how various sets of factors yield the same product. Make a chart of numbers 1-100. Have students circle all the numbers divisible by 2, draw a line through numbers divisible by 5, and put a triangle around numbers divisible by 10. Begin with multiples of 10 to show how students can identify factors of a number by applying rules of divisibility. Write down phone numbers and addresses. Have students check their divisibility.	Elementary Vol. I (E) Diskette #702 HBJ-6, TE, pp. 6, 184, 186. HBJ-7, TE, pp. 118, 121. HBJ-8, TE, pp. 89, 91. Software: San Diego Basic Skills in Math, Vol. 10, Objective 93. (E)
Demonstrate listing common factors and circling common factors. Demonstrate process of identifying greatest common factor. Ask students to find the greatest common factor for several numbers; have them respond on slates.	HBJ-6, TE, p. 187. HBJ-7, TE, p. 126. HBJ-8, TE, p. 95.
Make a prime number chart for numbers 1-100. Make posters or mobiles showing a factor tree of a given number. Make posters showing all possible factor trees for one given composite number such as 24 or 36.	HBJ-6, TE, pp. 189-192. HBJ-7, TE, pp. 122-125. HBJ-8, TE, pp. 92-93. Basic Mathematics Skills, pp. 49-50.

STRAND Whole Numbers

LEARNING Order

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Locates objects according to their positions in space. (K:I; 3:M) M00006 (KY) M00007 (KY)	1. Locates objects above and below, up and down, top and bottom. 2. Locates objects before, after, and between. 3. Locates objects in front and back of other objects. 4. Locates objects to the left and right of other objects.
Arranges numerals in order, 0-999. (2:M; 2:#) KM A Numeration 4-5, 7-12 KM A Numeration 5, 10, 12 KM A Numeration 20-21 M04019 (KY) M07001 (KY)	1. Arranges numerals in order 1-10. 2. Arranges numerals in each succeeding group of 10-100. 3. Rounds given numeral to nearest 10 in each succeeding group of 1-100. 4. Arranges numerals in order in each succeeding group of 100-1000. 5. Rounds given numeral to nearest 100 in each succeeding group of 100-1000.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Play "show me"; students locate and name the position. Use body, objects, pictures, or work sheets to identify desired position. Repeat activities above.	Age-appropriate objects Lotto picture cards Parts of a room Parts of body Pacemaker Arithmetic, Level A. (E) KeyMath Early Steps. (E) HBJ-K, TE, pp. 2-6. HBJ-2, TE, p. 22.
Model by using flashcards, number board, number line, or calendar. Repeat activity above. Request students to round their telephone numbers to the nearest ten, hundred, and thousand.	Number boards Flashcards Number line Calendar HBJ-1, TE, pp. 159-162, 167. HBJ-2, TE, pp. 11-12, 164-168, 252. HBJ-3, TE, pp. 33-34, 41, 44-47. HBJ-6, TE, p. 32. Basic Math Skills, pp. 3-5, 21. Life Skills Mathematics, pp. 243, 261. Mathematics for Consumers, pp. 14-15.
Provide paper money; have students arrange paper money denominatins $100-$1000 in order.	Simulated money paper, pencil

STRAND Whole Numbers

LEARNING Order

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies numbers before, after, and between 1-999. (2:M; 2:#) KM A Numeration 5, 10, 11-12 PIAT PL 17, 25 M04019 (KY) M07001 (KY)	1. Names numbers that come after the numbers 1-10. 2. Names numbers that come before the numbers 2-10. 3. Rounds given numeral to nearest 10 in each succeeding group of 1-100. 4. Arranges numerals' order in each succeeding group of 100-1000. 5. Rounds given numeral to nearest 100 in each succeeding group of 100-1000.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Ask the students to-- locate number that comes after a given number on a number line; write the missing number that comes after a given number shown on a flash card or ditto.	Number line Flash cards with selected number and blank (Example 2 ___) Duplicated work sheets with given and missing numbers
Ask the students to-- locate numbers that come before a given number on a number line; write the missing number that comes before a given number on a flashcard or work sheet.	Number line Flashcards with selected numbers preceded by a blank (Example ___ 2) Work sheets Basic Mathematics Skills, pp. 3-5, 21. Life Skills Mathematics, pp. 243, 261. Mathematics for Consumers, pp. 14-15.
Request the students to-- round their telephone numbers to the nearest ten, nearest hundred, and the nearest thousand	Paper Pencil Telephone numbers
Provide paper money. Have students arrange the paper money denominations $100-$1000 in order.	Money
Ask the students to-- locate numbers that come before a given number on a number line; write the missing number that comes before a given number on a flashcard or work sheet.	Number line Flashcards with given numbers preceded by a blank (___ 200) San Diego Basic Skills in Math, Vol. 1, Objectives 5-9. (E)

STRAND Whole Numbers

LEARNING Order

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies numbers before, after, and between 1-999. (2:M; 2:#) KM A Numeration 5, 10, 11-12 PIAT PL 17, 25 M04019 (KY) M07001 (KY)	6. Names the numbers that come between two given numbers from 1-100. Names the numbers that come after 100-999. Names the numbers that come before 100-999. Names the numbers that come between any two given number from 100-999.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Request the students to-- locate a number that comes between two given numbers on a number line; write the missing number that comes between two given numbers shown on a work sheet or flashcards.	Number line Flashcards with given numbers and a blank between (2 ___ 4) San Diego Basic Skills in Math, Vol. 2, Objective 13. (E) HBJ-2, TE, pp. 175-176.

STRAND Whole Numbers

LEARNING Number Sentences

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Illustrates a number sentence. (1:I; 2:M)	1. Draws a picture to demonstrate a number sentence that states equality. 2. Draws a picture to demonstrate a number sentence that states an inequality.
Selects the number sentence appropriate to solving problems using the four basic operations.	1. Selects the appropriate number sentence to show addition. 2. Selects the appropriate number sentence to show subtraction. 3. Selects the appropriate number sentence to show multiplication. 4. Selects the appropriate number sentence to show division.
Writes a number sentence for a verbal problem. (3:M, 3:#)	1. Solves a given number sentence using addition, subtraction, multiplication, division. 2. Determines the correct operation for a verbal problem. 3. Writes a number sentence given a verbal problem.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Ask students to-- arrange objects to show equality or inequality balance a scale to show equality show inequality on a balance scale	KeyMath Balance, K-8. (E, M, H) Sum Clown. (E) Smith, Gale. Modern Mastery Drills in Arithmetic, Grade 2. Wilkinsburg, PA: Hayes School Publishing Co., 1975. (E) HBJ-1, TE, pp. 198-200, 205-206, 211-212, 217-218, 246. HBJ-2, TE, pp. 43, 46, 74, 79, 83, 85, 91-94, 129, 133, 135.
Ask students to match number sentences to given problems.	Geoboard, K-12 Abacus, K-12 Poker Chips K-12 KeyMath Chips. (E, M, H) HBJ-1, TE, pp. 284, 287. HBJ-2, TE, pp. 145-146.
Provide work sheets of number sentences for students to complete. Ask students to select the operation for described situations.	See materials above HBJ-6, TE, pp. 22-23, 107-109. HBJ-7, TE, pp. 9, 61-67. HBJ-8, TE, pp. 37-40.

STRAND Whole Numbers

LEARNING Number Sentences

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Writes a number sentence for a verbal problem. (3:M, 3:#)	

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Instruct students to read selected problems and select the operation.	HBJ-6, TE, pp. 110-114. HBJ-7, TE, pp. 68-69.
Describe or read a problem; have students write the correct number sentence on chalkboard.	Greenes, Carol, et al. TOPS Developmental Workbook Series. Palo Alto, CA: Dale Seymour Pubs., 1980.

STRAND Whole Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies a given number as odd or even.	1. Identifies as odd or even any number from 1-10.
	2. Identifies as odd or even any number 1-50.
	3. Identifies as odd or even any given number 1-100.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Direct the students to-- separate 10 objects into pairs (even) and non-pairs (odd); match even numbers to pairs of objects and odd numbers to non-pairs (10 or less objects).	Assortment of age-appropriate objects Flashcards of numerals 1-10. San Diego Basic Skills in Math, Vol. 1, Objective 12. (E) HBJ-3, TE, p. 321. (E) HBJ-6, TE, p. 183. HBJ-7, TE, p. 117. HBJ-8, TE, p. 89.
Direct the students to-- locate and identify on a number line or ruler odd and even numbers; identify any given number on randomly selected flashcards as odd or even.	Number line and/or ruler Yard stick Flashcards of numerals 1-50 or KeyMath Chips. (E, M, H) Grid of squares or graph paper See materials for preceding activity. Flashcards of numerals 1-100

STRAND Whole Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY: empty set

OBJECTIVE	TASK ANALYSIS
Demonstrates an understanding of zero as an empty set in mathematical operations. (1:I; 2:R; 3:M; 3:#) M02002 (KY)	1. Demonstrates what happens when an empty set and a set of objects are joined. 2. Demonstrates what happens when an empty set is subtracted from a set of objects. 3. Demonstrates what happens when a set of given objects is subtracted from an empty set. 4. Demonstrates what happens when a given set is multiplied by the empty set. 5. Demonstrates that a given set cannot be divided by an empty set. 6. Demonstrates what happens when the empty set is divided.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Use concrete objects and direct the students to give the total number of objects when zero is added to a given amount. Use concrete objects and direct the students to give the total number of items when zero amount is subtracted from a given amount. Use concrete objects and demonstrate the correct amount when something is subtracted from nothing. Use concrete objects and direct the students to identify what occurs when a given set is multiplied by zero. Use concrete objects and identify what occurs when an attempt is made to divide a given set by an empty set.	Pencils and other age-appropriate manipulatives HBJ-K, TE, pp. 55-56. HBJ-1, pp. 24-32. HBJ-2, TE, p. 26. HBJ-3, TE, pp. 110-112, 155, 223, 260. HBJ-4, TE, pp. 54-55, 74-75, 243, 247, 256-257, 293. HBJ-5, TE, pp. 72, 77. HBJ-8, TE, pp. 30-31.

STRAND Whole Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY: greater than, less than, >, <

OBJECTIVE	TASK ANALYSIS
Uses symbols to indicate greater than (>) and less than (<). (4:M; 5:#) M02006 (KY) M04017 (KY)	1. Places correct symbol in a picture sentence. 2. Identifies the smaller or larger of any two whole numbers. 3. Places correct symbol in a number sentence.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Display objects in two groups on a table and use a bent pipe cleaner to make a symbol for less than or greater than; students identify each as made.	Pipe cleaners; age-appropriate objects
Write numbers and signs on squares or chips; students arrange in correct order.	KeyMath Chips. (E, M, H)
Provide practice via dittos or board work in selecting correct sign to complete statements.	Pacemaker Arithmetic Program, Level A. (E)
	Age-appropriate games
Direct a game where a score will be judged greater or less than.	San Diego Basic Skills in Math, Vol. I, Objectives 3 and 4. (E)
	HBJ-3, TE, pp. 33-34.
	HBJ-4, TE, p. 18.
	HBJ-5, TE, p. 33.
	HBJ-6, TE, pp. 32, 38, 141-144, 148-149.
	HBJ-7, TE, pp. 25, 89, 146-147, 245.
	HBJ-8, TE, pp. 8, 62, 113-115.

STRAND Whole Numbers

LEARNING Addition

CRITICAL ATTRIBUTE:

VOCABULARY: addend, sum

OBJECTIVE	TASK ANALYSIS
Identifies total number of objects in separate groups. (K:I; K:#) KM D Addition 1-3 PIAT Sub 1, PL 7	1. Names sums no greater than 9. 2. Names sums no greater than eighteen. 3. Names one group as addend, names second group as addend, and names total as sum.
Names the sums for basic addition facts through 18. (2:M, 2:#) M01003 (KY) M02003 (KY) KM D Addition 4-5, 7	1. Relates (+) sign to addition. 2. Writes facts in vertical and horizontal form. 3. Supplies missing addend with sums through 18. 4. Recognizes that the order of addends does not change sum (commutative property).

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Direct students to-- perform addition stories by manipulating objects or placing pictures on a flannel board; match picture story with sum.	Flannel board and pictures Objects from home and classroom Kit: KeyMath Early Steps. (E) KeyMath Card Decks. (E) KeyMath Chips. (E, M, H) Calculator such as Little Professor (E) HBJ-1, TE, pp. 29-36, 82-90, 99-106
Direct students to select the addition sign from an assortment of symbols. Direct students to arrange numbers on squares or chips to show a given problem in horizontal and vertical form. Direct students to add numbers or weights to a balance to show a missing addend balancing an equation. Model the commutative property using concrete materials; have students imitate. Direct the students to locate sums on an addition chart proving the commutative property.	Math balance such as KeyMath Balance (E, M, H) Pacemaker Arithmetic, Levels C, D. (E) Modern Mastery Drills in Arithmetic, Grades 3-6. (E, M) Fiar, Jan. Electric Drill: Whole Numbers. Palo Alto, CA: Creative Publications, 1977. (M, H) Base ten materials (E, M, H) Software: MECC. Elementary, Vol. I, Diskette #705. (E) San Diego Basic Skills in Math, Vol 3, Objectives 26-28; Vol 4, Objectives 29-33. (E) Math Desk Squares--Addition/subtraction. (E, M, H)

67

STRAND Whole Numbers

LEARNING Addition

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Names the sums for basic addition facts through 18. (2:M, 2:#) M01003 (KY) M02003 (KY) KM D Addition 4-5, 7	
Adds six-digit numbers requiring renaming. (6-8:R; 6-8:#) M02015 (KY) M03001 (KY) M04001 (KY) M06007 (KY) KM D Addition 6-7, 9-10	1. Rewrites problems from horizontal form to vertical form. 2. Adds two- through six-digit numbers without renaming. 3. Adds sums to 1000 renaming 1's and 10's. 4. Adds numbers less than 1000 renaming 1's, 10's and 100's. 5. Adds five- and six-digit numbers with renaming. 6. Adds up to five whole numbers of five digits each.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
	HBJ-1, TE, pp. 29-36, 49, 82-90, 99-106, 113, 176, 198-204, 211-216, 223. HBJ-2, TE, pp. 25-30, 37, 49, 53-56, 72, 74-75, 77-78, 83-84, 91-92, 124, 126-128, 132-134, 143, 291, 298.
Provide drill sheets of addition problems.	Modern Mastery Drills in Mathematics, Books 3-6.
Demonstrate regrouping using base 10 materials.	Electric Drill: Whole Numbers. Software: MECC. Elementary, Vol. I, Diskette 705. San Diego Basic Skills in Math, Vol. 4, Objectives 29-33. (E) Math Desk Squares, Addition, Subtraction. HBJ-6, TE, pp. 3-5, 11-14. HBJ-7, TE, pp. 3-5. HBJ-8, TE, p. 10.

STRAND Whole Numbers

LEARNING Subtraction

CRITICAL ATTRIBUTE:

VOCABULARY: minuend, subtrahend, remainder

OBJECTIVE	TASK ANALYSIS
Manipulates sets of objects by removing a set from another and identifying the remaining set. (K:I) KM # Subtraction 1-3 PIAT PL 18	1. Identifies the total amount as the minuend. 2. Identifies the take away set as being the subtrahend. 3. Identifies the remaining set as the remainder.
Identifies subtraction as the inverse operation of addition. (1:I; 2:R; 3:M; 3:#)	
Names differences for basic subtraction facts through 18. (2:M, 2:#) M01004 (KY) KM # Subtraction 4-5, 7-8	1. Relates (-) sign to subtraction. 2. Writes all facts in vertical and horizontal form through 18. 3. Names differences for basic facts through 9. 4. Names differences for basic facts through 18. 5. Supplies the missing numerals in subtraction facts through 18.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Using concrete objects, direct the students to construct any given set. Using concrete materials, direct the students to remove any given set. Direct the students to name the remaining set of concrete objects.	Age-appropriate manipulatives HBJ-K, TE, pp. 121-124.
Direct the students to identify (-) sign from an assortment of given symbols.	Flashcards or KeyMath Chips. (E, M, H)
Provide subtraction facts on flannel board, chalkboard, magnet boards or overhead projector.	Flannel board, chalkboard, magnet boards or overhead
Provide correct answer to given number sentences through 9.	Student-made "Show Me" cards
Provide subtraction work sheets with missing numerals.	Teacher-made work sheets with missing addends Software: San Diego Basic Skills in Math, Vol. 4, Objectives 36-40. (E) HBJ-1, TE, pp. 41-48, 50-52, 91-98, 107-116, 177-178, 205-210, 217-222, 224-225. HBJ-2, TE, pp. 31-36, 50, 80-81, 86, 88, 136, 144.

STRAND Whole Numbers

LEARNING Subtraction

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Names differences for basic subtraction facts through 18. (2:M, 2:#) M01004 (KY) KM # Subtraction 4-5, 7-8	
Subtracts six-digit numbers requiring renaming. (6-8:R; 6-8:#) M02016 (KY) M03003 (KY) M04002 (KY) M06008 (KY) KM E Subtraction 7-10	1. Subtracts from numbers having two or more digits. 2. Subtracts from numbers having two or more digits with renaming (no zeros in subtrahends). 3. Subtracts from subtrahends containing zeros.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	HBJ-3, TE, pp. 6-8, 10-11, 13, 16. HBJ-6, TE, pp. 3-4. HBJ-7, TE, p. 3.
Provide "Magic Squares" for students to solve. Provide math puzzle; have students compute answers to math puzzles. Direct the students to solve conservation of energy problems. Play "Arithmetic Bingo."	Mathworks. (E, M, H) Creative Math. (E, M) **Duplicating Masters:** Judy Instructo Staff. Math Games and Activities. Minneapolis: Instructor, 1975. _____. Math Fun Series. Instructo, 1978. Partheus, Richard. Energy Savers Math. Instructo, 1981. Hozell, B. G. Arithmetic Bingo. Instructor, 1979. **Software:** MECC. Elementary, Vol. I, Diskette #702. (E) San Diego Basic Skills in Math, Vol. 4-5, Objectives 39-50. (E) HBJ-6, TE, pp. 16-21, 235. HBJ-7, TE, pp. 6-8, 94. HBJ-8, TE, pp. 11-13.

STRAND Whole Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY: product, factor

OBJECTIVE	TASK ANALYSIS
Uses sets to show meaning of multiplication. (1:I; 2-3:R) KM F Multiplication 1-2	1. Arranges a given number of sets with equal numbers of objects. 2. Identifies amount in a set as a factor, identifies number of sets as a factor, and totals the product.
Names products for basic multiplication facts through 9 x 9. (4:M; 4:#) M03004 (KY) KM F Multiplication 3-5	1. Identifies (x) sign as it relates to multiplication. 2. Solves repeated addition problem and rewrites as a multiplication problem. 3. Recognizes that changing the order of factors produces the same product.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide age-appropriate manipulatives; ask the students the total product from identified sets.	Age-appropriate manipulatives MECC. Elementary, Vol. I, Diskette #702. (E) HBJ-2, TE, pp. 253-259, 264, 267-270. HBJ-3, TE, pp. 139-144, 146-150, 152, 153. HBJ-4, TE, pp. 67-87.
Ask students to select multiplication sign from an assortment of symbols. Ask students to solve multiplication facts on flannel board, chalkboard, or magnetic board.	Flannel board and an assortment of pictures or shapes
Ask students to find products on a multiplication chart. Point out that reversing the order of th factors yields the same product (commutative property).	MECC. Elementary, Vol. I, Diskette #705. (E) San Diego Basic Skills in Math, Vol. 5-6, Objectives 53-65. (E) Faxactly Game--Basic Multiplication Facts. (E, M) Calculator (E) KeyMath Card Decks. (E, M, H) Marcy, Steve, and Marcy, Janis. Mathimagination, Book A. Palo Alto, CA: Creative Publications, 1973. (E, M) Pacemaker Arithmetic, Levels E & F. (E, M, H) MECC. Elementary, Vol. I, Diskette #706. (E)

STRAND Whole Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY: product, factor

OBJECTIVE	TASK ANALYSIS
Names products for basic multiplication facts through 9 x 9. (4:M; 4:#) M03004 (KY) KM F Multiplication 3-5	
Computes product of two numbers with three digits each. (6-8:R; 6-8:#) M04003 (KY) M06008 (KY) KM F Multiplication 6-8, 10	1. Multiplies a number of two or more digits by a one-digit number. 2. Multiplies a two-digit number by a two-digit number. 3. Multiplies a three- or four-digit number by a two-digit number. 4. Multiplies a three- or four-digit number by a three-digit number.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	Desk Squares--Multiplication/ Division. (E, M, H)
	HBJ-3, TE, pp. 224-229.
	HBJ-4, TE, pp. 70-89.
	HBJ-6, TE, pp. 6-8.
	HBJ-7, TE, p. 10.
	HBJ-8, TE, pp. 3, 5.
Provide math puzzles.	HBJ-6, TE, pp. 52-63, 66.
Provide work sheets.	HBJ-7, TE, pp. 33-35, 43.
	HBJ-8, TE, pp. 15-17.
	HBJ-6, TE, pp. 70-71.
	HBJ-7, TE, pp. 36-41.
	HBJ-8, TE, p. 18.
	Multiplication and division games
	Shea, James, et al. Working with Numbers. Austin, TX: Steck Vaughn, 1983. (E, M, H)
	Electric Drill--Whole Numbers. (M, H)
	HBJ-4, TE, pp. 251-253

STRAND Whole Numbers

LEARNING Division

CRITICAL ATTRIBUTE:

VOCABULARY: quotient, divisor, remainder, dividend

OBJECTIVE	TASK ANALYSIS
Separates objects into equal sets. (K:1) KM G Division 1-2 PIAT PL 31	1. Separates group of objects into sets of equal size. 2. Separates group of objects into sets of unequal size.
Names the quotients for basic division facts through 81 ÷ 9. (4:M; 4:#) KM G Division 3-4 PIAT PL 32	1. Recognizes two symbols that mean division. 2. Solves repeated subtraction problems. 3. Rewrites subtraction problems as division problems. 4. Recognizes division facts as the inverse of multiplication facts.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Model separating objects into evenly divided groups.	Age-appropriate manipulatives HBJ-2, TE, pp. 267-271.
Use multiplication chart to find division facts. Use dot array (in math boxes) to interpret and draw dot pictures involving the equal partitions and sets.	Flannel or magnetic board and an assortment of symbols and numerals KeyMath Chips. (E, M, H) KeyMath Card Decks. (E, M, H) Desk Squares--Multiplication/ Division. (E, M, H) Mathimagination, Book A. (E, M) Pacemaker Arithmetic, Level F. (E, M, H) Taylor, F. D., et al. Basic Practice in Division. Denver, CO: Love Publishers, 1976. (E, M, H) MECC. Elementary, Vol. I, Diskette #702, #705. HBJ-6, TE, pp. 9-10. HBJ-7, TE, p. 11. HBJ-8, TE, pp. 4-5.

STRAND Whole Numbers

LEARNING Division

CRITICAL ATTRIBUTE:

VOCABULARY: quotient, divisor, remainder, dividend

OBJECTIVE	TASK ANALYSIS
Finds the quotient of a five-digit number divided by a two-digit number. (6:M; 6:#; 7-8:R; 6-8:#) M04004 (KY) M06008 (KY) KM G Division 5, 6, 7, 9	1. Computes problems yielding a one-digit quotient and a remainder. 2. Computes problems with a one-digit divisor yielding a two-digit quotient. 3. Computes problems with a one-digit divisor yielding a three-digit quotient. 4. Computes problems with two-digit divisor yielding a one-digit quotient. 5. Computes problems with a two-digit divisor yielding a two- or three-digit quotient.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide math puzzles on division.	San Diego Basic Skills in Math, Vol. 7-8, Objectives 68-80.
Provide work sheets on each of the following type of problem: one-digit divisor yielding a two-digit quotient; one-digit divisor yielding a three-digit quotient; two-digit divisor yielding a one-digit quotient; two-digit divisor yielding a two- or three-digit quotient.	HBJ-3, TE, pp. 247-267, 356. HBJ-4, TE, pp. 116-130, 301-307. HBJ-5, TE, pp. 265-275, 278-283. HBJ-6, TE, pp. 77-97, 399. HBJ-7, TE, pp. 18-20, 44-53. HBJ-8, TE, pp. 22-27.

STRAND Whole Numbers

LEARNING Problem Solving

CRITICAL ATTRIBUTE:

VOCABULARY: Venn diagram

OBJECTIVE	TASK ANALYSIS
Solves oral word problems using sets of objects, pictures or diagrams. M01003 (KY) M06001 (KY) M08014 (KY) M01004 KY) M06002 (KY) M08015 (KY)	1. Using an identified operation, solves word problems using objects. 2. Chooses the operation to solve problems using objects. 3. Obtains relevant data from charts, pictures and graphs, and uses the data to solve oral word problems. 4. Uses Venn diagrams to solve oral word problems. 5. Identifies missing information needed to solve problems.
Solves two-step word problems involving addition, subtraction, multiplication and division. M02005 (KY) M03002 (KY) M03003 (KY) M03004 (KY) M04008 (KY) M06008 (KY) M04020 (KY)	1. Identifies relevant data from presented information. 2. Determines correct operation needed to solve one-step problems. 3. Writes an equation for a one-step problem. 4. Solves one-step story problems. 5. Writes equations for two-step problems. 6. Solves two-step story problems.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide chips and blocks or other manipulatives; give students a problem and identify the operation; then ask students to solve it.	Age-appropriate manipulatives Seymour, Dale. Visual Thinking Cards. (E, M, H)
Have students draw a picture to demonstrate the solution to a word problem.	Appropriate charts, graphs and pictures TOPS: Techniques of Problem Solving. HBJ-6, TE, pp. 15, 107-114, 121-123. HBJ-7, TE, pp. 9, 61-67, 73-77. HBJ-8, TE, pp. 37-40, 46-48, 50-53.
Provide charts, graphs or pictures and have students report or record data relevant to solving a problem.	
Present oral data and have students use Venn diagrams to demonstrate operation being performed with given sets.	
Provide story problems for students to discuss. Ask students to identify relevant data by raising their hands when it is heard. Write data on overhead.	Overhead projector or chalkboard Yeager, David. Story Problems Series. Palo Alto, CA: Creative Publications, 1981. (E)
Direct students to describe or write their own problems. Ask students to determine operation(s) for their own problems.	Mystery Story Problems, pp. 64, 84. (E) HBJ-6, TE, pp. 15, 22-25, 56-57, 66-67, 82, 86, 89, 100-101, 107-123, 236.
Have students exchange problems and determine the correct operations.	HBJ-7, TE, pp. 9, 21, 23, 40-41, 51, 54, 55, 61-77. HBJ-8, TE, pp. 14, 19, 37-53, 137.

STRAND Whole Numbers

LEARNING Problem Solving

CRITICAL ATTRIBUTE:

VOCABULARY: Venn diagram

OBJECTIVE	TASK ANALYSIS
Estimate sums, differences, products and quotients using reasonableness of answer. M05001 (KY) M05002 (KY) M06003 (KY) M04021 (KY)	1. Estimates sums. 2. Estimates differences. 3. Estimates products. 4. Estimates quotients. 5. Estimates answers to word problems.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Write a word problem and an answer on cards. Have students draw a card and decide if the answer is reasonable. While checking work, ask students to advocate for their answer, proving its reasonableness. Read problems (number or word) to class. Have students quickly write down and answer using estimation.	Seymour, Dale. Developing Skills in Estimation. Books A and B. Creative Publications, 1981. (M, H) Reys, Robert, and Reys, Barbara. GUESS: Guide to Using Estimation Skills and Strategies. Creative Publicatons, n.d. (E, M, H) HBJ-6, TE, pp. 42, 118-119. HBJ-7, TE, pp. 269, 273, 275, 280. HBJ-8, TE.

STRAND Rational Numbers

LEARNING Fractions

CRITICAL ATTRIBUTE:

VOCABULARY: fraction, fractional, whole number, improper fraction, ratio, numerator, denominator, equivalent, mixed number

OBJECTIVE	TASK ANALYSIS
Demonstrates an understanding that a whole can be divided into equal parts. (K, 1:I) M03012 (KY) M04003 (KY) M05006 (KY) KM B Fractions 1-5 PIAT PL-13	1. Recognizes a fraction as a part of a whole.
	2. Recognizes that the bar in a common fraction means division.
	3. Recognizes equivalent fractions.
	4. Recognizes any number over itself as a fractional form of one.
	5. Identifies the numerator and the denominator.
Changes ratios to fractions. (6:M; 6:#) M04003 (KY) KM B Fractions 6-10 PIAT PL-13	1. Recognizes a fractional part of a group.
	2. Names a fractional part of a group.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Cut up various foods into fractional parts.	Cakes, apples, oranges, pizzas HBJ-K, TE, pp. 75-78. HBJ-1, TE, pp. 272-277. HBJ-2, TE, pp. 214-221. HBJ-3, TE, pp. 199-200, 205-206. HBJ-4, TE, pp. 190-191. HBJ-5, TE, pp. 197-200, 297. HBJ-6, TE, pp. 129-131, 134-137. HBJ-7, TE, pp. 137-138, 142. HBJ-8, TE, pp. 105-106, 109-110.
Compare the bar in fractions to other division signs.	Paper, pencil
Play variations of Pizza Party Game. Play variation of Fraction Card Games. Play variations of Fraction Dominoes.	Pizza Party. (E, M) Finding Fractions Card Games I & II. (E, M, H) Fraction Dominoes. (E, M)
Provide selected activities from Fractions with Pattern Blocks.	Fractions with Pattern Blocks. (E, M) Pattern Blocks. (E, M)
Same as above	Same as above.
Provide batting averages of local baseball players.	Sports section from the newspaper HBJ-5, TE, pp. 212, 214.
Provide a list of items for sale (e,g., 4 candy bars for $1.00).	Food ads from a newspaper

STRAND Rational Numbers

LEARNING Fractions

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Simplifies fractions to their lowest terms. M05007 (KY)	1. Demonstrates that all even numbers are divisible by 2. 2. Demonstrates that all numbers that end in 0 or 5 are divisible by 5. 3. Recognizes that simplifying a fraction does not change its value. 4. Demonstrates that in order to simplify a fraction, both the numerator and the denominator must be divided by the same number. 5. Uses a structured approach in choosing a common divisor. 6. Simplifies fractions to their lowest terms and checks accuracy of answer.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide practice in repeated simplification of a large fraction (e.g., 24/100) by repeatedly dividing by 2.	San Diego Basic Skills in Math, Vol. 8, Objective 86; Vol. 10, Objectives 96-97. (E) Vold, Kenneth C. Math Magic. Oaklawn, IL: Ideal, n.d. (M, H) _____. Math Mazes. Ideal, n.d.

STRAND Rational Numbers

LEARNING Fractions

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Changes improper fractions to mixed numbers. (6:M) M06005 (KY) KM B Fractions 11	1. Comprehends that any whole number over 1 is an improper fractions (e.g., $\frac{5}{1}$). 2. Defines a mixed number. 3. Changes mixed numbers to improper fractions. 4. Changes improper fractions to mixed numbers.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Write numbers at random on overhead, chalkboard, posterboard, or 3 x 5 cards.	Overhead, chalkboard, poster board, 3 x 5 cards, etc. (E, M, H)
Instruct the students to circle all improper fractions in a puzzle or on a work sheet or transparency.	Teacher-made puzzles/work sheets (E, M, H)
Use concrete objects and demonstrate wholes, fractions, and mixed amounts.	Bryant, Nerissa, and Hedgpath, Lay. Mathematics in Daily Living. Austin, TX: Steck-Vaughn, 1978. (M, H)
Provide work sheets on improper fractions.	Assorted age-appropriate concrete materials.
Hold a drill-down with small groups.	Shea, James, et al. Working with Numbers. Austin, TX: Steck-Vaughn, 1983. (E, M, H)
	Hilliard, Fultra. All About Fractions. Johnstown, PA: Mafex, 1972. (E, M, H)
	Fair, Jan. Electric Drill: Fractions. Creative Publications, 1977. (M, H)
	HBJ-4, TE, pp. 186, 187.
	HBJ-5, TE, pp. 205-207, 210.
	HBJ-3, TE, p. 210.
	HBJ-6, TE, pp. 132-133, 144.
	HBJ-7, TE, pp. 140-141.
	HBJ-8, TE, pp. 115-116.

STRAND Rational Numbers

LEARNING Fractions

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Uses symbols to indicate greater than (>) and less than (<) in number sentences involving fractions. M04013 (KY) M07007 (KY)	1. Uses correct symbol (>) or (<) in a picture sentence. 2. Uses correct symbol in a number sentence with two fractions having like denominators. 3. Uses correct symbol in a number sentence with more than two fractions with like denominators. 4. Uses correct symbol in a number sentence with two fractions with unlike denominators. 5. Uses correct symbol in a number sentence with more than two fractions with unlike denominators.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Use pictures of congruent shapes, shaded to show various fractions. Have students visually determine which is greater or less.	Flannel board
	Pizza Party. (E, M)
	Construction paper, scissors
On a work sheet or on the chalkboard draw number sentences with pictures of fractions; have the students fill in < or >.	HBJ-6, TE, pp. 141-142.
	HBJ-7, TE, pp. 146-148.
Direct students to draw congruent rectangles divided into eighths. Have them shade in a given number of parts in each. Ask them how the pictures are alike (eighths) and how they are different (number shaded).	HBJ-8, TE, pp. 113-114.
Write fractions with like denominators on squares of paper. Have students arrange them in order from least to greatest.	
Demonstrate how fractions with the same numerator but different denominators can be compared by considering the size of the parts.	
Demonstrate cross multiplying to order fractions with unlike denominators. Have students practice.	
Demonstrate ordering fractions by changing them to equivalent fractions with like denominators.	

STRAND Rational Numbers

LEARNING Decimals

CRITICAL ATTRIBUTE:

VOCABULARY: decimal

OBJECTIVE	TASK ANALYSIS
Explains function of a decimal point. KM A Numeration 19 KM D Addition 11 & 13 KM E Subtraction 11-12 KM F Multiplication 9 KM G Division 8 PIAT PL-43, 58	1. Relates use of decimal to money situations. 2. Applies use of decimal to other situations.
Changes decimals to equivalent common fractions. (5:M) M08003 (KY)	1. Matches decimal place value to common fraction denominator value. 2. Matches common fractions to equivalent decimals.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Instruct the students to demonstrate that a decimal separates whole dollars from the cents or parts of dollars. Let students add one dollar, one dime and one penny on the calculator.	Money (E, M, H) Calculator (E, M, H)
Instruct the students to study gasoline pumps and their use of decimal fractions.	Decimal Story Problems. (E, M) HBJ-3, TE, pp. 83-86. HBJ-4, TE, pp. 58, 61. HBJ-5, TE, pp. 45-47, 216-221. HBJ-6, TE, pp. 43-44. HBJ-7, TE, p. 83. HBJ-8, TE, p. 59.
Provide work sheets for matching .5 to 5/10, .07 to 7/100, and similar examples.	Place value chart Decimal Squares. (E, M)
Provide work sheets and instruct students to draw a blue line under the decimal .5 and then under every fraction equivalent to .5 (e.g., 2/4, 3/6, 6/12).	HBJ-3, TE, pp. 211-212. HBJ-4, TE, pp. 198-199. HBJ-5, TE, pp. 215-218. HBJ-6, TE, pp. 146-147, 228. HBJ-7, TE, pp. 167-169. HBJ-8, TE, pp. 107-108.

STRAND Rational Numbers

LEARNING Decimals

CRITICAL ATTRIBUTE:

VOCABULARY: decimal

OBJECTIVE	TASK ANALYSIS
Rounds decimal numbers to nearest hundredths. (6:M; 6:#) M05017 (KY) M08016 (KY) KM A Numeration 20-21	1. Rounds decimal numbers to nearest tenth. 2. Rounds decimal numbers to nearest hundredth.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide work sheets to round off decimal numbers to the nearest tenth.	Basic practice in fractions (E, M, H)
Provide work sheets to round off decimal numbers to the nearest hundredth.	San Diego Basic Skills in Math, Vol. 17, Objectives 164 & 166; Vol. 18, Objective 167. (E)
On note cards, write decimal numbers and their equivalent fractions. Randomly distribute decimal and fraction cards to the students. Using two teams, have a member of each team decide if two cards held up by the opposite team are equivalent. Each team continues until an error is made. The two teams then switch roles. The winning team will have the largest number of correct responses.	HBJ-5, TE, pp. 222-223. HBJ-6, TE, pp. 150-151. HBJ-7, TE, pp. 90-91. HBJ-8, TE, pp. 63-64.
Provide work sheets with a list of decimals and ask students to provide three equivalent common fractions for each.	

STRAND Rational Numbers

LEARNING Decimals

CRITICAL ATTRIBUTE:

VOCABULARY: decimal

OBJECTIVE	TASK ANALYSIS
Uses symbols to indicate greater than (>) and less than (<) in number sentences involving decimals. M05018 (KY) M07009 (KY)	1. Orders decimals according to their relative size.
	2. Uses correct symbols (>) and (<) in a number sentence with decimal numerals that have the same number of places.
	3. Uses correct symbols (>) and (<) in a number sentence with decimal numerals that have different numbers of places.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Write the decimals 0.1 and 0.9 on the chalkboard; have the students fill in missing numbers. Increase the task's difficulty by writing the decimals 0.51 and 0.55 and have the students fill in the missing numbers.	HBJ-5, TE, pp. 33, 220-221. HBJ-6, TE, p. 148. HBJ-7, TE, p. 87. HBJ-8, TE, p. 62.
Make a set of twenty decimal cards at an appropriate level of difficulty. Give students two or more to order. Give the entire set to a group or individual to order. Keep a record of times and have the students try to beat each other's times.	
Explain olympic scoring in figure skating, gymnastics or diving. Make up scores, have students compare and order and write appropriate symbols beside the comparisons.	Copies of different issues of Sports Illustrated
Request students to compare elapsed times in sporting events. First compare times in minutes then compare minutes and seconds, and parts of seconds. Direct students to use the appropriate symbol in each comparison.	Digital watches or clocks Stopwatch

STRAND Rational Numbers

LEARNING Percents

CRITICAL ATTRIBUTE:

VOCABULARY: percent

OBJECTIVE	TASK ANALYSIS
Changes equivalent percents to common fractions. (5:E) M06006 (KY) M07021 (KY) M08003 (KY) KM B Fractions 1, 2, 3 KM J Word Problems 11-12 PIAT Sub 1-Math PL 47 PIAT Sub 1-Math PL 78	1. Matches common fractions to equivalent percent. 2. Recognizes 100 as denominator of all fractions equivalent to percents.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use a pocket chart and flash cards with fractions and percents. Each student must draw one card from the stack of fraction cards and place it in the pocket chart next to the appropriate percent.	Fraction chart
Provide and fill in blanks on a chart of equivalent percents and fractions with student input.	Teacher-made visual aids showing fractions and equivalent percents Duplicated work sheets of fractions and equivalent percents San Diego Basic Skills in Math, Vol. 100, Objectives 2, 4, 6. HBJ-6, TE, pp. 265, 267, 269, 271. HBJ-7, TE, pp. 239, 242. HBJ-8, TE, pp. 213, 215, 217.

STRAND Rational Numbers

LEARNING Percents

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Changes decimals to percents. M06006 (KY) M08003 (KY)	1. Matches decimals to equivalent percents.
	2. Transforms decimals to percents by moving decimal two places to right, then writing percent symbol to the right of the numeral.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Instruct students to match on a chart decimals to equivalent percents.	Play money Teacher-made Concentration board
Play "Concentration" game of equivalent fractions, decimals, and percents.	HBJ-6, TE, pp. 266-268, 270. HBJ-7, TE, p. 240.
Model and have students imitate moving decimal two places to right and adding percent sign.	HBJ-8, TE, p. 214. Overhead
Have students complete work sheet of changing decimals to percent.	Smith, Gale. Modern Mastery Drills in Arithmetic, Grades 6 & 7. Wilkinsburg, PA: Hayes School Pub. Co., 1975. (M)

STRAND Rational Numbers

LEARNING Percents

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Applies use of fractions, ratios, decimals, and percents to everyday living. M08004 (KY) KM B Fractions 1, 2, 3 KM J Word Problems 11-12 PIAT Sub 1-Math PL 47 PIAT Sub 1- Math PL 98	1. Uses fractions in many everyday living skills. 2. Uses ratios in many everyday living situations. 3. Uses percents in everyday situations involving money.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate how to measure and sew seams of 1/2", 3/4", 3/8", and hems of 1 1/2", 2 1/3", and 3 3/4".	Unbleached muslin, thread, scissors, ruler, yardstick
Demonstrate measurement of wood for a bird house prior to construction.	Saw, yardstick, ruler, hammer, nails, glue, paint and wood
Provide batting averages in local baseball and demonstrate how to compute.	Sports section from newspaper
Select the best buy in food items (e.g., 3 for $1 or $.45 each) and prove.	Newspaper ads for food
Provide various sales taxes for 5 items selected from a catalogue.	Assorted catalogs
Play Percento.	Percento. (E, M, H) HBJ-6, TE, pp. 272-275. HBJ-7, TE, pp. 246-248, 252-253. HBJ-8, TE, pp. 218, 220, 222, 224-226.

STRAND Rational Numbers

LEARNING Addition

CRITICAL ATTRIBUTE:

VOCABULARY: like, unlike, common denominator

OBJECTIVE	TASK ANALYSIS
Adds common fractions with like and unlike denominators. (5:M) M05008 (KY) KM D Addition 12, 14, 15 KM F Multiplication 11	1. Recognizes that only fractions with like denominators can be added. 2. Finds least common multiple of two denominators. 3. Adds two fractions with common denominators. 4. Finds least common multiple of three or more denominators. 5. Adds three or more fractions with unlike denominators. 6. Simplifies fractions to their lowest terms.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Demonstrate on an overhead/ chalkboard adding fractional parts with like denominators.	Pizza Party. (E, M)
	Student-made fractional parts (E, M, H)
Demonstrate adding fractional parts with unlike denominators, by exchanging pieces for equivalent like fractions.	Fraction Dominoes. (E, M)
	Fit-a-Fraction Circles. (E, M)
Instruct students to exchange groups of fractional parts for a single or simpler group.	Greenes and Immerzeel. Moving Up in Fractions. Allen, TX: DLM Teaching Resources, n.d. (E, M, H)
	San Diego Basic Skills in Math, Vol. 10, Objectives 98, 99. (E)
	HBJ-4, TE, pp. 182, 185, 192, 194.
	HBJ-5, TE, pp. 287-288, 300.
	HBJ-6, TE, pp. 138-139, 194, 201, 208.
	HBJ-7, TE, pp. 128-129, 144-145, 149-154.
	HBJ-8, TE, pp. 96, 117.

STRAND Rational Numbers

LEARNING Addition

CRITICAL ATTRIBUTE:

VOCABULARY: like, unlike, common denominator

OBJECTIVE	TASK ANALYSIS
Adds decimal numbers. (5:M; 5:#; 6-7:R; 6-7:#) M05022 (KY) KM D Decimals 11-13 KM E Subtraction 11-12 KM F Multiplication 9 KM G Division 8	1. Identifies that decimals must be aligned. 2. Rewrites decimals from horizontal form or word problems form to vertical form. 3. Adds decimals after writing them in proper alignment.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide students with a list of decimals which they must write vertically in alignment.	Pacemaker Arithmetic, Level E. (E, M, H) Electric Drill: Decimals. (M, H) Mathimagination, Book E. (E, M)
Teach students to write decimals in expanded form by adding zeros in order to keep columns aligned when adding.	Greenes and Immerzeel. Moving Up in Decimals. Allen, TX: DLM Teaching Resources, n.d. (E, M, H) HBJ-3, TE, p. 215. HBJ-4, TE, pp. 201-202. HBJ-5, TE, pp. 308-309. HBJ-6, TE, pp. 230-231, 243. HBJ-7, TE, pp. 92, 94-97. HBJ-8, TE, pp. 65, 67. San Diego Basic Skills in Math, Vol. 18, Objectives 170-173. (E)

STRAND Rational Numbers

LEARNING Addition

CRITICAL ATTRIBUTE:

VOCABULARY: like, unlike, common denominator

OBJECTIVE	TASK ANALYSIS
Adds mixed numbers with unlike denominators. (5:I; 6:M; 6:#) M06020 (KY) KM D Math 14-15	1. Adds a fraction to a whole number. 2. Adds mixed numbers with like denominators. 3. Adds mixed numbers with unlike denominators.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Add whole amounts to fractional amounts (e.g., 1 cup of water to 1/2 cup of water; 1 whole pie to 1/4 pie). Instruct students to find the total amount. Add mixed amounts of liquid or dry products; encourage students to develop problems and solve. Instruct students to exchange unlike fractional amounts for equivalent like amounts (e.g., exchange 1/2 and 1/3 for 3/6 and 2/6). Provide work sheets on adding mixed numbers to whole numbers, mixed numbers with like and unlike denominators.	Measuring cups, water, flour, etc. Fraction pieces, student-made or commercially available such as Pizza Party (E, M) Duplicating Masters: Beede, Rudy, et al. Action Math: Fractions. Grand Rapids, NJ: Instructional Fair, 1985. (E, M) Basic Skills in Mathematics: Fractions. (E, M) Fraction Story Problems. (E, M) Working with Numbers. (E, M, H) Modern Mastery Drills in Arithmetic, Grades 6-8. (M, H) San Diego Basic Skills in Math, Vols. 11, 12; Objectives 106-116. (E) HBJ-5, TE, pp. 289, 295, 299, 301. HBJ-6, TE, pp. 202, 210, 212. HBJ-7, TE, p. 155. HBJ-8, TE, pp. 117-118, 121.

STRAND Rational Numbers

LEARNING Subtraction

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Subtracts common fractions with like and unlike denominators. (5:M; 6:#) M05009 (KY) M06020 (KY)	1. Recognizes that only fractions with like denominators can be subtracted. 2. Finds least common multiple of two denominators. 3. Subtracts two fractions with like denominators. 4. Finds least common multiple of three or more denominators. 5. Subtracts two or more fractions with like denominators. 6. Simplifies fractions to their lowest terms.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Explain answers to work sheets by adding fractions with like denominators on the overhead/ chalkboard. Explain answers to work sheets by finding least common multiple of two denominators and subtracting on overhead transparency. Explain answers to work sheets by adding fractions with like denominators on the overhead/ chalkboard. Explain answers to work sheets by finding least common multiples of three or more denominators and subtracting on overhead transparency.	Modern Mastery Drills in Arithmetic, Books 5-6-7. (E, M) **Duplicating Masters:** Taylor, F. D. Basic Practice in Subtracting Fractions. Denver, CO: Love Publishing Co., 1981. (E, M, H) Moving up in Fractions. (E, M, H) HBJ-4, TE, pp. 183, 185, 193-194. HBJ-5, TE, pp. 290, 302. HBJ-6, TE, pp. 204-205, 208-209. HBJ-7, TE, pp. 149-154. HBJ-8, TE, pp. 117, 119. San Diego Basic Skills in Math, Vol. 13, Objectives 121-122. (E)

STRAND Rational Numbers

LEARNING Subtraction

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Subtracts decimal numbers. (5:M; 5:#; 6-7:R; 6-7:#) M06007 (KY) KM E Subtraction 11, 12	1. Identifies that decimals must be aligned. 2. Subtracts decimals in vertical form with decimals aligned. 3. Rewrites decimals from horizontal form or word problems to vertical form and correctly aligns and adds them.
Subtracts mixed numbers with unlike denominators. (6:M; 6:#) M06020 (KY) KM E Subtraction 13, 14	1. Subtracts whole numbers from mixed numbers. 2. Subtracts a mixed number from a mixed number without regrouping. 3. Subtracts a fraction from a whole number. 4. Subtracts mixed numbers with like denominators with regrouping. 5. Subtracts mixed numbers with unlike denominators with regrouping.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Use flashcards with money written in decimal form and demonstrate how to align decimals.	Teacher-made flashcards of money written in decimal form HBJ-5, TE, pp. 310-312.
Model subtracting decimals.	HBJ-4, TE, pp. 201, 205. HBJ-6, TE, pp. 232-233.
Demonstrate rewriting decimals from horizontal to vertical form.	HBJ-7, TE, pp. 93-96. HBJ-8, TE, pp. 66-67. Modern Mastery Drills in Arithmetic, Books 5-7.
Provide work sheets on subtraction of whole numbers from mixed numbers.	Modern Mastery Drills in Arithmetic, Books 5-7. Howett, Jerry. Basic Skills in Mathematics, Unit 1. Newton, MA: CEBCO Division of Allyn & Bacon, Inc., 1981. (M, H)
Provide work sheets on subtraction of mixed number from mixed number without regrouping.	San Diego Basic Skills in Math, Vol. 14, Objectives 129-131; Vol. 13, Objectives 123-126; Vols. 18-19, Objectives 177-180. (E)
Provide work sheets on subtracting fractions from whole numbers.	HBJ-5, TE, p. 303.
Provide work sheets on subtracting mixed numbers with like denominators with regrouping.	HBJ-6, TE, pp. 211-212. HBJ-7, TE, pp. 156-157.
Provide work sheets on subtraction of mixed numbers from mixed numbers with regrouping.	HBJ-8, TE, pp. 117, 119-121.

STRAND Rational Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Multiplies a simple fraction by a simple fraction. (5:M; 6:#) M06020 (KY) M07008 (KY)	1. Identifies a fractional part of a whole. 2. Multiplies numerator times numerator. 3. Multiplies denominator times denominator. 4. Simplifies fractions to lowest terms.
Computes the product of decimal numbers. (5:M; 5:#) M05023 (KY) M06007 (KY) M07010 (KY) KM F Multiplication 9	1. Determines the decimal point location in already computed products. 2. Computes the product of two decimal numbers. 3. Inserts the decimal in the computed product consistent with the total number of decimal places in the multiplier and multiplicand.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Draw or cut a fractional part of a whole; ask students to identify given fractional part.	Chalkboard or paper Student-made fractional parts Overhead transparency
Provide work sheets for practice in identifying fractional parts.	Moving Up in Fractions. (E, M, H) Herlihy, Ruth. Basic Math Drill: Fractions Exercises. St. Louis, MO: Milliken Publishing Co., 1978. (M, H) Herlihy, Ruth. Math Workbook, Fractions. St. Louis, MO: Milliken Publishing Co., 1980. (E, M, H) HBJ-5, TE, pp. 304-305. HBJ-6, TE, pp. 214-215. HBJ-7, TE, pp. 158-159. HBJ-8, TE, pp. 124-125.
Place decimals in products; have students imitate. Provide work sheets. Compute products on a transparency; have students compute products on a work sheet.	Modern Mastery Drills in Mathematics, Grades 6 & 7. (M, H) Herlihy, Ruth. Moving Up in Decimals. (E, M, H) Basic Math Drill: Decimal Exercises. (M, H) Mathematics, Grade 6. (M) HBJ-5, TE, pp. 315-317.

STRAND Rational Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Computes the product of decimal numbers. (5:M; 5:#) (Continued) M05023 (KY) M06007 (KY) M07010 (KY) KM F Multiplication 9	
Multiplies a simple fraction by a whole number. (5:M; 5:#) M06020 (KY) M07008 (KY) KM F Multiplication 11	1. Changes a whole number to an improper fraction. 2. Multiplies the numerator times the numerator. 3. Multiplies the denominator times the denominator. 4. Simplifies fractions to their lowest terms.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	HBJ-6, TE, pp. 237-243.
	HBJ-7, TE, pp. 98-101.
	HBJ-8, TE, pp. 69-70, 72.
Demonstrate fractional parts of whole numbers using manipulatives and concrete examples.	Fractional parts and manipulatives
	Basic Skills in Mathematics, Vol. 14, Objective 134. (E)
	HBJ-4, TE, p. 197.
	HBJ-5, TE, pp. 306-307.
	HBJ-6, TE, p. 216.
	HBJ-7, TE, pp. 160-162.
	HBJ-8, TE, p. 126.
Provide work sheets.	Mathimagination, Book D. (E, M)
	Programmed Math, Book 6.
Provide work sheets.	
Provide work sheets.	

STRAND Rational Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Multiplies a whole number by a mixed number. M07008 (KY) KM F Multiplication 11	1. Changes a whole number and a mixed number to improper fractions. 2. Multiplies the numerator times the numerator. 3. Multiplies the denominator times the denominator. 4. Simplifies fractions to their lowest terms.
Multiplies a simple fraction by a mixed number. M07008 (KY)	1. Changes the mixed numbers to improper fractions. 2. Multiplies the numerator times the numerator. 3. Multiplies the denominator times the denominator. 4. Simplifies the fractions to their lowest terms.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Demonstrate the multiplication of fractional parts times a whole number.	Fractional parts Electric Drill: Fractions. (M, H)
Provide work sheets.	Mathimagination, Book D. (E, M)
Provide work sheets.	HBJ-6, TE, p. 218. HBJ-7, TE, pp. 160-162.
Provide work sheets.	HBJ-8, TE, p. 127.
Demonstrate concepts using manipulatives and concrete examples.	Manipulatives of fractions/wholes
Provide work sheets.	Mathimagination, Book D. (E, M) Programmed Math, Book 6. (E, M)
Provide work sheets.	HBJ-6, TE, pp. 217-218.
Provide work sheets.	HBJ-7, TE, pp. 160-162. HBJ-8, TE, p. 127.

STRAND Rational Numbers

LEARNING Multiplication

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Multiplies a mixed number by a mixed number. (7:M; 7:#) M07008 (KY)	1. Changes mixed numbers to improper fractions. 2. Multiplies numerator by numerator. 3. Multiplies denominator by denominator. 4. Simplifies fractions to their lowest terms.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Play "trade in" fractional parts for equivalent whole; play "trade in" wholes for equivalent fractional parts. Provide work sheets.	Fractional parts Electric Drill: Fractions. (M, H) Mathimaqination, Book D. (E, M) San Diego Basic Skills in Math, Vol. 15, Objectives 139-142; Vols. 19-20, Objectives 184-189. (E) HBJ-6, TE, pp. 217-218. HBJ-7, TE, pp. 160-162. HBJ-8, TE, p. 127.

STRAND Rational Numbers

LEARNING Division

CRITICAL ATTRIBUTE:

VOCABULARY: reciprocal

OBJECTIVE	TASK ANALYSIS
Divides a simple fraction by a simple fraction. (6:M; 6:#) M07008 (KY) KM G Division 10	1. Identifies divisor, dividend, and quotient in a division sentence. 2. Inverts the divisor. 3. Changes the division sign to a multiplication sign. 4. Divides a simple fraction by a simple fraction following the rules of multiplication.
Divides a decimal number by a decimal number. (6:I; 6:#; 7:M; 7:#) M07020 (KY)	1. Divides a decimal by a whole number correctly placing the decimal. 2. Locates the decimal point in an already computed quotient. 3. States rule for placement of decimal in division sentence. 4. Divides a decimal number by a decimal number.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate on an overhead/ chalkboard, the divisor, dividend, and quotient in a division sentence.	Overhead, individual chalkboards, individual wipeaway boards, paper, pencil
Demonstrate how to invert using materials listed above. Provide work sheets.	HBJ-6, TE, pp. 219, 221. HBJ-7, TE, pp. 163, 165. HBJ-8, TE, pp. 130-131. Teacher-made work sheets
Demonstrate using material listed above. Provide work sheets on dividing simple fraction by a simple fraction.	Modern Mastery Drills in Mathematics, Books 6, 7, and 8.
Demonstrate on an overhead/ chalkboard, dividing decimal number by a whole number. Provide work sheets on placement of decimal in a given quotient. Provide rule for placement of decimal; direct students to record rule on a tape recorder. Provide work sheets on division of a decimal number by a decimal number.	Overhead, chalkboards, wipeaway boards Modern Mastery Drills in Mathematics, Books 6, 7, and 8. HBJ-6, TE, pp. 246-253. HBJ-7, TE, pp. 104-109. HBJ-8, TE, pp. 74, 76-77. Basic Skills in Mathematics, Vol. 15, Objective 145; Vol. 20, Objectives 193-199. (E) Tape and tape recorder Modern Mastery Drills in Mathematics, Books 6, 7, and 8. (E, M)

STRAND Rational Numbers

LEARNING Division

CRITICAL ATTRIBUTE:

VOCABULARY: reciprocal

OBJECTIVE	TASK ANALYSIS
Divides a mixed number by a mixed number. (6:I; 7:M; 7:#) M07008 (KY)	1. Divides a whole number by a fraction. 2. Divides a fraction by a whole number. 3. Divides a whole number by a mixed number. 4. Divides a mixed number by a mixed number.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate dividing a whole number by a fraction; have students imitate. Provide work sheets on dividing a whole number by a fraction. Demonstrate dividing a fraction by a whole number. Provide work sheets on dividing a fraction by a whole number. Demonstrate dividing a whole number by a mixed number. Provide work sheets on dividing a whole number by a mixed number. Demonstrate dividing a mixed number by a mixed number. Provide work sheets on dividing a mixed number by a mixed number.	Overhead, chalkboard, wipeaways HBJ-6, TE, pp. 220-221. HBJ-7, TE, pp. 164-166. HBJ-8, TE, pp. 131-135. San Diego Basic Skills in Math, Vol. 16, Objectives 149-155. (E)

STRAND Rational Numbers

LEARNING Problem Solving

CRITICAL ATTRIBUTE:

VOCABULARY: means, extremes, ratio, proportion

OBJECTIVE	TASK ANALYSIS
Solves oral word problems using fractional parts of objects, models, or pictures. BMS, MM LSM, MM MFC, MM	1. Exchanges fractional parts for equivalent parts. 2. Finds sums and differences with fractional parts. 3. Finds products and quotients with fractional parts. 4. Uses 100-square grids to solve decimal and percent problems.
Solves word problems involving rational numbers. M06008 (KY) BMS, MM LSM, MM MFC, MM	1. Applies problem-solving strategies used with whole numbers (see Whole Numbers, Problem Solving, Objective 2) a. common fractions b. decimals c. percents. 2. Identifies rational proportions. 3. Writes proportions. 4. Uses proportions to solve problems. 5. Solves for a missing term of a proportion.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide pictures from magazines (plates of cookies, cakes, a group of people, a group of like objects) and create problems about the pictures. Engage the students in a match game of either fraction, decimal, or percent dominoes. Request the students to match equivalent numbers. Provide a 100-square grid for the students. Give the students fraction, decimal, and percent problems to solve.	Pizza Party. (E, M) Student-made fractional parts Magazines HBJ Aids Masters DLM
Provide word problems for students to solve. Ask the students to invent their own problems to solve or exchange and solve. Write the numbers 2, 4, 9, and 18 on the board; have the students arrange as a proportion. Present similar exercises. Write the digits 1-9 on index cards. Shuffle them and place six cards on the chalk tray. Have the students write as many true proportions as possible. Determine if polygons are similar using proportions. Give students problem in rate and distance, money, and measurement to solve using proportions.	Chalkboard Index cards HBJ-6, TE, pp. 145, 213, 244-245, 247, 264. HBJ-7, TE, pp. 96, 102-103, 108, 157, 161, 166, 229-233. HBJ-8, TE, pp. 68, 71, 78, 80, 122-123, 128-129, 135, 199, 201-204.

STRAND Rational Numbers

LEARNING Problem Solving

CRITICAL ATTRIBUTE:

VOCABULARY: means, extremes, ratio, proportion

OBJECTIVE	TASK ANALYSIS
Uses estimation skills to recognize reasonableness of results. M08017 (KY)	1. Estimates sums of rational numbers. 2. Estimates differences of rational numbers. 3. Estimates products of rational numbers. 4. Estimates quotients of rational numbers.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use measuring cups, filled with water or sand, to show fractional amounts to be added, subtracted, multiplied, or divided. Have students estimate by looking at them and comparing and rounding each to the nearest whole to find sums, differences, products, and quotients. Give students problems with reasonable and unreasonable answers. Have them take turns as lawyers convincing the class of the answers' reasonableness or unreasonableness.	Measuring cups HBJ-7, TE, pp. 245, 269, 273, 275, 280.

STRAND Real/Complex Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Writes an equivalent whole number for an exponential expression. (8:I; 9:R) M07006 (KY)	1. Demonstrates the base as the repeated factor. 2. Demonstrates the exponent as the number of times the factor is repeated. 3. Writes repeated factor in exponential form. Example: $2 \times 2 \times 2 \times 2$ is 2^4. 4. Uses factors to demonstrate given exponential expression. 5. Writes word expressions in exponential form. Example: 2 to the fourth power is 2^4. 6. Writes the products for given exponential expressions.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Use in a card match game format, a calculator to find matches. Example: 2 x 2 x 2 = 8.	3 x 5 cards Calculator
Let, on an overhead chart, students match other known math symbols to given words. Then model matching giving examples such as 2^2 is another way of writing 2 x 2; 2^3 is another way of writing 2 x 2 x 2; and so on. Ask the students to fill in missing elements on a chart with missing exponents or repeated factors.	Overhead transparency HBJ-6, p. 64. HBJ-7, pp. 16, 34, 39, 99, 125. HBJ-8, pp. 20-21.
Have, on a teacher-constructed match game sheet, the students connect repeated factors to exponent forms.	Duplicated game sheets
Ask the students to construct a match card game or draw a match game on repeated factors and their exponential form.	3 x 5 cards
Direct students to play a teacher-constructed seek-and-find overhead game with given factors and randomly selected transparency cards; put the exponential expressions on the board. Direct students to find and match the equivalent expressions.	Overhead transparencies
Model matching word expressions to exponential forms. Direct students to imitate what was modeled.	Overhead transparencies
Have, in a beanbag toss game setting, the student who is holding the bag when the music stops give the product for a given exponential expression.	Beanbag Recording Tape player

STRAND Real/Complex Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Writes the exponents for powers of ten.	1. Demonstrates that the number of zeros in the product when the base is 10 is the same as the exponent.
	2. Writes repeated base tens in exponential form ($10 \times 10 \times 10 = 10^3$).
	3. Writes the product for given base ten exponential expressions.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use an overhead and have the students count the zeros in each multiple of ten. Then have students compare the number of zeros in the product to the exponent. Example: $10 \times 10 = 100 = 10^2$.	Overhead HBJ-6, p. 65. HBJ-7, p. 17.
Ask the students, on teacher-constructed game sheet, to draw a line from the repeated base tens to the correct exponent form. Provide practice in writing exponential forms for repeated base tens.	Duplicated work sheet
Direct the students to play a card game ("Old Maid" format) matching products to base ten exponential expressions.	3 x 5 cards

STRAND Real/Complex Numbers

LEARNING Order of Operations

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Uses the order of operations to simplify a numerical expression using whole numbers. M08001 (KY)	1. Simplifies expressions with parentheses. 2. Simplifies expressions without parentheses. 3. Simplies expressions requiring operations in addition to those inside parentheses.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Teach students the memory track "My Dear Aunt Sally" in which the letters M.D.A.S. correspond to the first letter of the operations in the order of their completion. Have students underline or circle the first operation to be completed. Have students, with calculators, work expressions using the memory key. Show the students an expression using large cards, the overhead projector, or chalkboard. Have students race to see who can solve it first and put answers on a slate or pad to hold up.	Calculators Individual slates or tablets HBJ-4, p. 13. HBJ-5, p. 24. HBJ-6, p. 52. HBJ-7, pp. 130-131. HBJ-8, pp. 29, 246.

STRAND Real/Complex Numbers

LEARNING Concepts

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Writes numbers in scientific notation.	1. Demonstrates each number 100-100,000,000 as a product of base 10. 2. Demonstrates each product of base 10 (100-100,000,000) in exponential form. 3. Writes the standard number for a scientific notation. Example: 5.3×10^4 is 53,000. 4. Writes each given number as a scientific notation. 5. Writes scientific notation for given word sentences.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Write numbers 100-100,000,000 in a vertical list on the board/overhead and have student change each number to a product of 10s; for example, 1000 = 10 x 10 x 10.	Transparency Overhead
Request another student to write each product in exponential form.	HBJ-7, pp. 110-112. Life Skills Mathematics, pp. 265, 282.
Use transparency to model; have student imitate.	Transparency Overhead

STRAND Calculator Literacy

LEARNING Calculator Use

CRITICAL ATTRIBUTE:

VOCABULARY: clear, cancel, memory

OBJECTIVE	TASK ANALYSIS
Operates keys for on, off, clear, and cancel.	1. Identifies key for on. 2. Identifies key for off. 3. Identifies key for clear. 4. Identifies key for cancel.
Operates keys to perform four basic mathematical operations.	1. Identifies and operates the addition key. 2. Identifies and operates the subtraction key. 3. Identifies and operates the multiplication key. 4. Identifies and operates the division key.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide various types of calculators for students to compare.	Assortment of calculators
Give the following directions: Locate on key for each calculator. Locate off key for each calculator. Locate clear key on each calculator. Locate cancel key for each calculator.	Vervoort, Gerardus. Beginning Calculator Math. Belmont, CA: David S. Lake, Pubs., 1980. (I, M) Keystrokes: Calculator Activities for Young Students. Creative Publications, 1979. (E, M) Pushbutton Mathematics: Calculator Math Problems. Prentice-Hall, 1982. (M, H) Miller, Don. Calculator Explorations and Problems. Cuisenaire, 1980. (E, M, H)
Provide various calculators to identify basic operation keys. Provide assorted calculator games for each of the four basic operations. Provide various work sheets for each of the four basic operations.	Immerzeel, George, and Ockenga, Earl. Calculator Activities for the Classroom. Books 1 & 2. Creative Publications, 1977. (E, M) Engebrecht, Victor. Calculator Activities for Elementary Students. Hayes School Publishers, 1980. (E, M)
Direct a game using calculators against human computation.	Gallery, Michael. Money Matters: Learning the Calculator. DLM. o.p.* (E, M, H) HBJ-6, TE, p. T403. HBJ-7, TE, p. T433. HBJ-8, TE, p. T433.

*The abbreviation o.p. following an entry means that the item is not currently available for purchase. Many school and public libraries, however, already have copies of these materials.

STRAND Calculator Literacy

LEARNING Calculator Use

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Operates memory function.	1. Identifies memory key. 2. Demonstrates use of memory function.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide a variety of calculators.	Assortment of calculators (E, M, H)
Select assorted age-appropriate math games.	Calculator Activities for the Classroom. Books 1 & 2. (E, M)
Provide assorted work sheets on multi-step problems requiring the use of memory function.	Calculator Activities for Elementary Students. (E, M)
	Spanga, Francis. Get Set for Calculator Math. (I, M, H)
	Gallery, Michael. Money Matters: Learning the Calculator. (E, M, H)
	Calculator Explorations and Problems. (E, M, H)

STRAND Measurement

LEARNING Money

CRITICAL ATTRIBUTE:

VOCABULARY: coin, bill

OBJECTIVE	TASK ANALYSIS
Names the value of individual coins and bills to $10. (4:M; 4:#) M01005 (KY) M03005 (KY) M04011 (KY) KML Money 2, 3, 4, 7, 9 PIAT Sub 1 PL16	1. Identifies a penny, nickel, dime, quarter, and half dollar. 2. Identifies the exchange value of each lesser coin for each greater coin (Example: 5 pennies for a nickel). 3. Identifies a $1, a $5, and a $10 bill. 4. Identifies the number of each of the following coins which is equivalent in value to $1: penny, nickel, dime, quarter, and half dollar. 5. Identifies the exchange value of each of the lesser bills for each greater bill to $10.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Play a "Show Me" game of what coins named when drawn at random from a box.	Assortment of U.S. coins
Direct students in playing "Count Your Change Game."	Count Your Change Game. (E, M)
Let students use newspaper ads to shop for groceries.	Quinn, Treva. Grocery Bills. Johnstown, PA: Mafex, 1979. (M, H)
Select work sheets on exchange value of coins for coins.	Kahn, Charles, and Bradley, J. Hanna. Money Makes Sense. Belmont, CA: David S. Lake Pubs., 1983. (E, M, H)
Select work sheets on exchange of smaller bills for larger bills.	Working with Money. (E)
	Coin Dice. (E, M)
	Coin Rubber Stamp Set: Heads and Tails. (E, M)
	Software: MECC. Elementary, Vol. I, Diskette #706. (E)
	HBJ-K, TE, pp. 125-128.
	HBJ-2, TE, pp. 184-196, 285.
	HBJ-1, TE, pp. 228-234.
	HBJ-3, TE, pp. 127-131.
	Zanzirs, Gene. Working with Money. Hamden, CT: Learning Systems Corp., 1979.

STRAND Measurement

LEARNING Money

CRITICAL ATTRIBUTE:

VOCABULARY: making change

OBJECTIVE	TASK ANALYSIS
Makes correct change up to $20.00. (5; 6:M) M06017 (KY) KM L Money 8, 11, 13 PIAT 1 Math PL14	1. Makes correct change for $1 when purchase is less than $1. 2. Makes correct change for $5 when purchase is less than $5. 3. Makes correct change for $10 when purchase is less than $10.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide numerous items that cost less than $1.	Assorted items each costing less than $1
Demonstrate counting change; student imitates.	Kahn, Charles, and Bradley, J. Hanna. Working Makes Sense. David S. Lake Pubs., 1983. (E, M, H)
Use work sheets for counting change.	**Activity Cards:** Murphy, Donna M. Moving Up in Money I. Allen, TX: DLM, 1976. (E, M) _____. Moving Up in Money II, 1981. (E, M) HBJ-6, TE, pp. 24-25, 115, 236.
Provide numerous items that cost less than $5.	Teacher-selected work sheets
Demonstrate counting change; have students imitate.	Assorted items each costing less than $5
Use work sheets for counting change.	Newspaper Math. (M) MECC. Elementary, Vol. I. Diskette #706.
Provide numerous items that cost less than $10.	Teacher-selected work sheets
Demonstrates counting change; have students imitate.	Assorted items each costing less than $10
Use work sheets for counting change.	Using Dollar and Sense. (E, M, H) Teacher-selected work sheets

STRAND Measurement

LEARNING Money

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Makes correct change up to $20.00. (5; 6:M) (Continued) M06017 (KY) KM L Money 8, 11, 13 PIAT 1 Math PL14	4. Makes correct change for $20 when purchase is less than $20.
Counts change accurately. (5-6:M)	1. Counts groups of homogeneous coins. 2. Determines total value of each group of homogeneous coins. 3. Counts groups of coin combinations. 4. Determines total value of each group of coin combinations. 5. Counts groups of combinations of coins and bills. 6. Determines total value of groups of coin and bill combinations.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

148

ACTIVITIES	MATERIALS
Provide items that cost less than $20.	Assorted items each costing less than $20
Demonstrate counting change; have students imitate.	Buying with Sense. (E, M, H) HBJ-1, TE, pp. 228-234. HBJ-2, TE, pp. 195-196, 285-286. HBJ-3, TE, pp. 127-128, 130-131. HBJ-4, TE, pp. 60-61, 144-145.
Provide groups of homogeneous coins.	Assortment of coins
Provide work sheets of homogeneous coins for students to complete.	Teacher-selected work sheets
Provide groups of coin combinations.	Money Makes Sense. (E, M, H) Working with Money. (E)
Have students complete work sheets of coin combinations.	Foster, Elizabeth. Counting My Money. Books I, II, III, IV. Beaverton, OR: Dormac, 1980. (E)
Provide groups of coin and bill combinations.	Coin Dice. (E, M)
Have students complete work sheets of coin and bill combinations.	Wool, John. Using Money Series. Phoenix, NY: Frank Richards, 1982. (E, M) Coin Rubber Stamp Set: Heads and Tails. (E, M) Teacher-selected work sheets

STRAND Measurement

LEARNING Calendar

CRITICAL ATTRIBUTE:

VOCABULARY: calendar, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, date

OBJECTIVE	TASK ANALYSIS
Names days of week in order. (K:I; 1:M) M00010 (KY)	1. Identifies Sunday as the first day of the week. 2. Identifies each day of the week in the proper sequence. 3. States days of week in correct sequence.
Locates date on the calendar. (2:M; 2:#) M03014 (KY) KM N TIME 6-9, 14-15	1. Locates correct month on a calendar. 2. Locates correct day on a calendar. 3. Locates correct date on a calendar.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Lead students in singing songs naming the days of the week in sequence.	Age-appropriate songs
Have students arrange flash cards of days in proper sequence.	Flashcards with names of days of the week. HBJ-1, TE, pp. 241-242. HBJ-2, TE, pp. 15-16. HBJ-3, TE, p. 126.
Direct students in filling in a blank calendar.	Blank or teacher-made calendars (22½ x 28½)
Play card game "Scramble." Have students draw a card at random and locate the month named on calendars.	Assortment of calendars Flashcards with names of months
Help students play a card game of draw and locate a day on a transparency calendar.	Cards of days of the week and a transparency of a calendar
Play a game in which students compete to locate a date first when a flash card is shown.	Several calendars of the same type Flash cards of specific dates MECC. Elementary, Vol. 10, Diskette #737. (E) HBJ-1, TE, pp. 241-242. HBJ-2, TE, pp. 15-16. HBJ-3, TE, p. 126.

STRAND Measurement

LEARNING Calendar

CRITICAL ATTRIBUTE:

VOCABULARY: seasons

OBJECTIVE	TASK ANALYSIS
Explains relationships among days, weeks, months, seasons, and years. (4:I) KM N TIME 3, 14, 15 PIAT PL35	1. Equates days to week. 2. Equates weeks to month. 3. Equates weeks to year. 4. Equates months to year. 5. Equates seasons to year. 6. Equates days to year.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide work sheets on equating days to week. Let students play "Scramble."	Pacemaker Arithmetic Program, Level D. Flash cards (days of the week)
Provide work sheets on equating weeks to month.	
Provide work sheets on equating weeks to years.	
Provide work sheets on equating months to years. Let students play "Concentration."	Concentration board
Show appropriate pictures and ask students to name seasonal activities.	Drawing paper, markers Tape recorder
Provide work sheets on equating days to year.	Pacemaker Arithmetic Program, Level D. HBJ-4, TE, pp. 109, 237, 311.

STRAND Measurement

LEARNING Clock

CRITICAL ATTRIBUTE:

VOCABULARY: clock, hour, minute, second

OBJECTIVE	TASK ANALYSIS
Relates specific times to specific activities. (K:I; 1:R; 2:M) M00008 (KY) KM N TIME 5, 10, 12 PIAT 1 Math 21	1. Relates specific holidays to specific times of the year. 2. Relates specific activities to specific times of the year. 3. Relates specific activity to times of the day.
Equates the relationships of time. KM N TIME 11, 13, 16 PIAT 1 Math 28, 45	1. Equates 1 hour to 60 minutes. 2. Equates 1/2 hour to 30 minutes. 3. Equates 1/4 hour to 15 minutes. 4. Equates 24 hours to a day. 5. Equates 60 seconds to a minute.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Show pictures of events. Match time with events. Name specific activities for different times of year. Direct role playing for activities that occur during a day.	Posters, pictures flashcards, selected books.
Provide clocks and direct students to count 60 minutes. Use clock and direct students to color 1/2 hour and count amount of minutes in 1/2 hour.	Clock faces that have 60 minute marks HBJ-6, TE, pp. 310-311.
Use clock and direct students to count 15 more minutes and to color showing 1/4 hour.	Clock faces that have 60 minute marks
Provide flip chart/clock to demonstrate 24 hours in a day.	Flip and Learn: Time. (E)

STRAND Measurement

LEARNING Clock

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Tells time to the minute using a traditional and a digital clock. (3:I; 4:M) M01013 (KY) M02014 (KY) M03006 (KY) KM N time 5, 10, 12 PIAT 1 Math 21	1. Tells time by the hour. 2. Tells time by the half hour. 3. Tells time by the 1/4 hour. 4. Tells time at 5-minute intervals. 5. Tells time to the minute.
Tells future and past time. (5:I; 6:M) M06017 (KY) KM N Time 11, 13, 16 PIAT 1 Math 28, 45	1. Tells future time by hourly increments. Tells future time by 5-minute increments. Tells future time involving days and years. 2. Converts total minutes to hours and remaining minutes. 3. Tells past time by hourly increments, by small increments, and by involving days and years.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Instruct students in making paper-plate clocks and using them to tell time by the hour.	Paperplates or cardboard Paper clips or brads
Instruct students in making paper-plate clocks and using them to tell time by the half hour.	Judy Clock. First Clock. (E, M, H)
Instruct students in making paper-plate clocks and using them to tell time by the quarter hour.	Digital clock HBJ-3, TE, pp. 123-125.
Instruct students in making paper plate clocks and using them to tell time by 5-minute intervals.	HBJ-4, TE, pp. 104-106.
Instruct students in the use of a real clock.	Real clocks or watches
Provide work sheets, charts, cards, books, games, and posters to tell time in the future.	Telling Time Bingo. (E, M, H) Kahn, Charles, and Bradley, J. Hanna. Working Makes Sense. Belmont, CA: David S. Lake Pubs., 1983. (E, M, H)
Provide work sheets on changing total minutes to hours and minutes.	KeyMath Card Decks. (E, M) Telling Time. (E)
Provide work sheets, charts, cards, books, games, and posters to tell time in the past.	Learning About Time. (E, M) See materials listed under future time.

STRAND Measurement

LEARNING Clock

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Estimates time that will be needed to complete an activity.	1. Identifies different lengths of time for different daily activities. 2. Estimates different lengths of time for different daily activities usually untimed. 3. Estimates length of time for a school activity. 4. Estimates length of time for a work activity.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Assign specific activities which students are to "time" by noting the times the activity began and ended and calculating the elapsed time. Have students predict how long it will take to complete an activity and then determine whose estimate was closest to the actual time.	Cards listing selected activities

STRAND Measurement

LEARNING Temperature

CRITICAL ATTRIBUTE:

VOCABULARY: thermometer, degree (° symbol), Celsius, Fahrenheit

OBJECTIVE	TASK ANALYSIS
Tells purpose of a thermometer. (K; 1:I)	1. Identifies various types of thermometers.
	2. Lists uses of a thermometer.
Describes applications of thermometers in daily living. M05012 (KY) M05013 (KY)	3. Identifies three basic uses of a thermometer in the home.
	4. Identifies three basic uses of a thermometer outside the home.
	5. Identifies temperatures of water freezing, normal body temperature, and water boiling on both Celsius and Fahrenheit scales.
Reads thermometers in degrees. (2:I; 3:M; 3:#) M05015 (KY) KMM Meas. 17 PIAT Meas. PL53	1. Recognizes symbol for degrees (°).
	2. Reads thermometer using a Fahrenheit scale.
	3. Reads thermometer using Celsius scale.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide various types of thermometers for students.	Assortment of thermometers (Fahrenheit and Celsius)
Provide information for various basic uses of a thermometer in and outside of the home.	Learning About Weather. (E) Instructional weather center for the primary grades (E)
Provide information about the symbol for degrees. Provide information about the Fahrenheit scales. Provide information about the Celsius scale.	Overhead or chalkboard Thermometers that indicate degrees in Fahrenheit and Celsius San Diego Basic Skills in Math, Vol. 104, Objective 41. (E) HBJ-3, TE, pp. 292, 299. HBJ-4, TE, pp. 318, 327. HBJ-5, TE, pp. 247, 255. HBJ-6, TE, pp. 301, 309. HBJ-7, TE, pp. 273, 281. HBJ-8, TE, pp. 272-273, 279.

STRAND Measurement

LEARNING Capacity/Volume

CRITICAL ATTRIBUTE:

VOCABULARY: cup, pint, quart, gallon, metric, liter, kilo-, milli-

OBJECTIVE	TASK ANALYSIS
Measures liquid in English units. (2:I, 3:I, 6:M, 6:#)	1. Measures in arbitrary units of volume. 2. Equates: cups to pint, pints to quart, quarts to half-gallon, half-gallons to gallon. 3. Measures liquids to specified marked line on container: 1 cup (8 oz.), 3/4 cup (6 oz.), 1/2 cup (4 oz.), 1/4 cup (2 oz.), 1/3 cup (2 2/3 oz.).
Converts units of volume measurement within the metric system. (5:M)	1. Equates: milliliters to liters, liters to kiloliters. 2. Matches symbols: kL to kiloliter, L to liter, mL to milliliter. 3. Converts: milliliters to liters, liters to kiloliters.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Demonstrate equivalent amounts with water, sand, or salt. Direct students to prove equivalencies.	Measuring cups Empty milk or juice containers Empty freezer containers Water, sand, salt, rice, beans, grits, popcorn, bird seed Colored water Clear water
Demonstrate measurement of liquids in a glass or clear plastic measuring cup. Direct students to measure similarly.	San Diego Basic Skills in Math, Vol. 104, Objective 39. (E) HBJ-1, TE, pp. 137-138. HBJ-2, TE, pp. 69-70. HBJ-3, TE, pp. 295-296. HBJ-4, TE, pp. 324-325. HBJ-5, TE, pp. 252-253. HBJ-6, TE, pp. 306-307. HBJ-7, TE, pp. 278-279. HBJ-8, TE, p. 277.
Provide flash cards and work sheets for matching metric symbols to names.	Teacher-made work sheets
Provide definitions of mL, L, and kL. Provide examples of equivalency in real life situation such as medicine, gasoline, scientific experiments.	Graduated cylinder or set of beakers Metric Posters. (E, M, H) MECC. Elementary, Vol. 10, Diskette #737. (E)

STRAND Measurement

LEARNING Capacity/Volume

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Converts units of volume measurement within the metric system. (Continued) (5:M)	
Solves problems involving capacity/ volume. M06014 (KY) M09010 (KY) M01012 (KY) PIAT PL49 5 pp. 251-253	1. Estimates volume of small, familiar containers. 2. Estimates volume of large, familiar containers. 3. Determines which of two identical containers have more, less, or the same amount. 4. Calculates solids a. with formula. b. without formula.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	HBJ-1, TE, p. 134. HBJ-2, TE, pp. 65-66. HBJ-3, TE, p. 291. HBJ-4, TE, p. 316. HBJ-5, TE, p. 242. HBJ-6, TE, pp. 297-298. HBJ-7, TE, pp. 268-269. HBJ-8, TE, p. 270.
Display a variety of boxes, bottles, cans, and jars. Have students discuss and estimate the capacities of the containers. Show pictures of pools, hot water heaters, refrigerators, and the Great Pyramids; let students discuss and estimate volumes.	
Use base 10 materials (1000 cubic cm block) to demonstrate formula for a rectangular solid.	Base 10 materials
Provide real items for the students to measure and solve for volume (e.g., tissue boxes, book boxes, crates).	Common rectangular solids--boxes and crates

STRAND Measurement

LEARNING Capacity/Volume

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Solves problems involving capacity/ volume. (Continued) M06014 (KY) M09010 (KY) M01012 (KY) PIAT PL49 5 pp. 251-253	5. Calculates volume of cylinders a. with formula. b. without formula.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Explain the formula for volume of a cylinder ($V = \pi r^2 h$) using everyday items such as paint cans. Provide other objects for students to measure diameter and height and compute their volumes.	Common cylinders--paint cans, food cans, jars HBJ-6, TE, pp. 294-295, 305. HBJ-7, TE, pp. 272, 277, 332-334. HBJ-8, TE, pp. 20, 269-271, 331-335. Basic Mathematics Skills, p. 133. Life Skills Mathematics, p. 222.

STRAND Measurement

LEARNING Linear Measurement

CRITICAL ATTRIBUTE:

VOCABULARY: meter, foot, yard, mile, inches, centi-

OBJECTIVE	TASK ANALYSIS
Measure length in English Units. (1:I; 2:R; 3:M; 3:#) M01011 (KY) M06013 (KY) M02009 (KY) M06009 (KY) M03009 (KY) M06010 (KY) M04008 (KY) M03011 (KY) M05019 (KY) M06012 (KY) KMM Meas. 1-3, 6, 10, 12-14, 16, 21 PIAT PL40	1. Measures in arbitrary linear units. 2. Identifies the relationships and symbols for: 12 in. (") = 1 ft. ('), 3 ft. = 1 yd., 26 in. = 1 yd., 5280 ft. = 1 mile. 3. Identifies appropriate units to measure and appropriate tools to measure. 4. Estimates length of a given object. 5. Measures length of familiar objects using a ruler and a yard stick.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide charts identifying the relationship and symbols for: 12 in. = 1 ft., 3 ft. = 1 yd., 36 in. = 1 yd., 5280 ft. = 1 mile.	Charts 36" lengths of wood/cardboard 12" lengths of wood or cardboard MECC. Elementary, Vol. I, Diskette #702. (E)
Direct students in making rulers and yardsticks of cardboard or wood.	HBJ-1, TE, pp. 135-136. HBJ-2, TE, pp. 67-68. HBJ-3, TE, pp. 293-294. HBJ-4, TE, pp. 320-321. HBJ-5, TE, pp. 248-249.
Conduct a student measurement search in and out of the classroom using student rulers and yardsticks.	HBJ-6, TE, pp. 302-303. HBJ-7, TE, pp. 274-275. HBJ-8, TE, pp. 273-274. Age-appropriate objects MECC. Elementary, Vol. 10, Diskette #737. (E) San Diego Basic Skills in Math, Vol. 103, Objectives 33-36. (E)

STRAND Measurement

LEARNING Linear Measurement

CRITICAL ATTRIBUTE:

VOCABULARY: meter, foot, yard, mile, inches, centi-

OBJECTIVE	TASK ANALYSIS
Converts units of linear measurement within the metric system. (5:M; 6-8:R) M07014 (KY)	1. Matches mm to millimeter. Matches cm to centimeter. Matches m to meter. Matches km to kilometer. 2. Equates millimeters to meter. Equates centimeters to meter. Equates meters to kilometer. 3. Converts millimeters to meters. Converts centimeters to meters. Converts meters to kilometers.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide flash cards and work sheets for matching metric symbols to names.	Marotta, George. Learning the Metric System. Elizabethtown, PA: Continental Press, 1978. (E, M, H)
Provide chart and flash cards showing comparison of millimeters to meter, centimeters to meter, meters to kilometer.	Metric Measuring Package; Primary (E), Intermediate. (E, M)
Provide real life measurement problems. Ask students to convert from a larger unit to a smaller unit and vice versa. Example: How many meters tall is Mike if his height is 170 cm? (Answer: 1.70 meters)	HBJ-1, TE, pp. 131-132, 139. HBJ-2, TE, pp. 58-62, 71. HBJ-3, TE, pp. 281-284. HBJ-4, TE, pp. 93-98. HBJ-5, TE, pp. 229-233. HBJ-6, TE, pp. 281-285. HBJ-7, TE, pp. 259-265. HBJ-8, TE, pp. 261-264.

STRAND Measurement

LEARNING Linear Measurement

CRITICAL ATTRIBUTE:

VOCABULARY: perimeter

OBJECTIVE	TASK ANALYSIS
Determines the perimeter of a polygon. (3:I; 4:R; 5:M; 5:#) M04014 (KY) M06019 (KY) M09009 (KY) KM M Meas., 26-27	1. Defines perimeter. 2. Relates perimeter to life situations. 3. Finds the perimeter of a polygon when measurements are given. 4. Finds the perimeter of a polygon when measurements must be determined.
Finds circumference of a circle. M08006 (KY)	1. Finds circumference when given the formula and the diameter. 2. Finds circumference when given the formula and the radius.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide definition for perimeter and relate its use to life situations.	Meter stick Yardstick Rubber Geoboard Dot array Graph paper
Provide measurement; have students construct the perimeter of an object using given measurement.	
Provide the outline of a polygon or polygons. Direct students to measure and find perimeters.	Templates Mathmagination, Book F. (E, M) MECC. Elementary, Vol. 3, Diskette #738. (E) San Diego Basic Skills in Math, Vol. 103, Objective 37. (E) HBJ-2, TE, pp. 63-64. HBJ-3, TE, pp. 285-288. HBJ-4, TE, pp. 98, 101. HBJ-5, TE, pp. 233-236, 242. HBJ-6, TE, pp. 287-288. HBJ-7, TE, pp. 212-213, 215, 317-318, 328. HBJ-8, TE, pp. 160, 317, 335.

STRAND Measurement

LEARNING Area

CRITICAL ATTRIBUTE:

VOCABULARY: length, width, area, radius, square of a number, pi, grid, polygon, rectangle

OBJECTIVE	TASK ANALYSIS
Relates a given area to squares on a grid. (3:I; 4-5:R) M05010 (KY)	1. Finds area of a rectangular shape using actual square units cut from paper. 2. Names life situations in which it is necessary to know area.
Determines the area of a simple polygon. (4-5:M; 6-8:R; 4-8:#) M04015 (KY) M06021 (KY) M08007 (KY) PIAT 1 Math PL57	1. Finds the area of a rectangle ($A = l \times w$). 2. Finds the area of a square ($A = 4s$). 3. Finds area of a triangle ($A = \frac{l \times w}{2}$).

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Have students to cover area on a sheet of metric graph paper with square centimeters. Explain the process of taking measurements before buying carpeting, tile, sod, ceiling material.	Metric graph paper Construction paper Pictures from magazines Yardstick Water soluable markers HBJ-2, TE, pp. 63-64. HBJ-3, TE, pp. 287-288. HBJ-4, TE, pp. 99-101, 260. HBJ-5, TE, p. 107. HBJ-6, TE, p. 290. HBJ-7, TE, p. 319.
Direct students to mark off areas on a grid, geoboard, or graph paper. Provide formula for area of rectangle and demonstrate how to apply it. Ask students to find rectangles in the classroom and compute their areas. Explain and demonstrate the formula for finding area of square. Demonstrate that a triangle is one-half of a rectangle. Explain and demonstrate the formula for finding the area of a triangle.	KeyMath Boards. (E, M, H) KeyMath Rulers. (E, M, H) Zieslinski, Henry. Hayes Geometry. Wilkinsburg, PA: Hayes-Benton, 1968. (M, H) Lund, Charles. Dot Paper Geometry--With or Without a Geoboard. Baldwin, NY: Activity Records, n.d. (E, M) MECC. Elementary, Vol. 10, Diskette #737; Vol. 3, Diskette #738. (E) Chalkboard drawings Rectangles made from paper Tangrams

STRAND Measurement

LEARNING Area

CRITICAL ATTRIBUTE:

VOCABULARY: length, width, area, radius, squared number, pi

OBJECTIVE	TASK ANALYSIS
Determines the area of a simple polygon. (Continued) (4-5:M; 6-8:R; 4-8:#) M04015 (KY) M06021 (KY) M08007 (KY) PIAT 1 Math PL57	
Determines the area of a circle. (7:M; 8:R) M08007 (KY)	1. Identifies value of pi. 2. Demonstrates ability to square a number. 3. Applies the formula. $A = \pi r^2$.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	HBJ-4, TE, pp. 100-101. HBJ-5, TE, pp. 107, 238, 242, 250. HBJ-6, TE, pp. 291-292, 304. HBJ-7, TE, pp. 212-213, 266-267, 276, 319, 321, 323, 328. HBJ-8, TE, pp. 321, 325, 335.
Provide the definition of pi (π). Demonstrate how a squared number can be visibly shown to form a square on a dot array. Provide the formula $A = \pi r^2$ and demonstrate how to apply it. Provide circles; have students to use formula to find their areas.	Geoboard or dot array Circles posters Chalkboard compass San Diego Basic Skills in Math, Vol. 103, Objective 38. (E) HBJ-5, TE, pp. 179-180. HBJ-6, TE, pp. 291-292. HBJ-7, TE, pp. 214-215, 326-328. HBJ-8, TE, pp. 324-325, 335.

STRAND Measurement

LEARNING Mass/Weight

CRITICAL ATTRIBUTE:

VOCABULARY: mass, pound, ounce, gram

OBJECTIVE	TASK ANALYSIS
Measures weight in English units. (2-3:I; 4-5:R; 6:M; 6:#) KM M Meas. 11, 15, 18, 24	1. Equates: 1 pound (lb) to 16 ounces (oz), 2,000 lbs to 1 ton (T). 2. Weighs common items for real life situations. 3. Names weight to nearest pound or ounce.
Converts units of weight measurement within the metric system. (5-6:M; 6:#) M07014 (KY)	1. Identifies kilogram and gram on scale. 2. Matches relationships and symbols: 100 grams (g) = 1 kilogram (kg); 100 mg = 1 centigram (cg). 3. Converts metric units of weight.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide examples of items measured in ounces and/or pounds and tons.	Household objects and food items Piece of coal or ore
Use balance scale to prove 16 ounces is equivalent to a pound.	KeyMath Balance. (E, M, H)
Request students to weigh the following: self, piece of fruit, piece of loose candy, household or school item.	Balance scale with weight Bathroom scale Kitchen scale Produce scale HBJ-3, TE, pp. 297-298. HBJ-4, TE, p. 326. HBJ-5, TE, p. 254. HBJ-6, TE, p. 308. HBJ-7, TE, p. 280. HBJ-8, TE, p. 278.
Provide a scale and allow students to experiment with it.	Metric scale and standard weight Metric Posters (M, H)
Provide definitions of gram, milligram, centigram, and kilogram and show objects of equivalent weight.	Paper clips Liter of water KeyMath Balance. (E, M, H)
Provide real life measurement situations; ask students to convert between metric units: milligrams to centigrams, grams to kilograms, and reverse conversions.	Metric scale HBJ-3, TE, pp. 289-290. HBJ-5, TE, pp. 245-246.

STRAND Measurement

LEARNING Mass/Weight

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Converts units of weight measurement within the metric system. (Continued) (5-6:M; 6:#) M07014 (KY)	
Estimates weight of a given object. (2-3:I; 4-5; 7-8:R) M05011 (KY) M06015 (KY) M06016 (KY) KM M Meas. 11-15, 18	1. Estimates weight of small, familiar objects. 2. Estimates weight of larger, familiar objects. 3. Identifies appropriate unit to measure mass (English or metric). 4. Identifies appropriate tools to measure mass (English or metric).

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
	HBJ-6, TE, pp. 299-300. HBJ-7, TE, pp. 270-271. HBJ-8, TE, p. 271.
Provide a variety of small familiar objects and a scale to verify estimates.	Balance scale and weights Bathroom scale
Provide a variety of larger objects and a bathroom scale with which to verify estimates.	Assortment of real objects or pictures of objects
Give choices such as ounce, pound, and ton or milligram, gram, and kilogram; ask students to name the most appropriate measure for a designated object.	
Provide examples of many different kinds of scales, either real or in pictures.	

STRAND Geometry

LEARNING Position/Relationship

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Determines relative positions of two or more objects or figures. M00006 (KY) M02008 (KY) M04006 (KY)	1. Identifies specific positions: first, next, last, in, on, under, above, on top of, beginning, middle, beside, and center. 2. Explains positions: top, bottom, after, before, left, right, and between. 3. Identifies points inside, outside, and on a figure.
Determines relationships of two or more objects or figures. M00009 (KY) M02007 (KY) M04007 (KY) M07012 (KY) M07013 (KY)	1. Determines which object is longer, shorter, bigger, smaller, heavier, or lighter. 2. Identifies congruent figures. 3. Identifies similar figures.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Have the students demonstrate meanings of the words by taking specified positions. Have them stand next to a chair, on top of a box, beside a desk, etc. Have them point to the first child in line, etc. Have them point inside their mouths, outside their ear, etc.	
Have, after the above demonstration, students use objects such as blocks or boxes to demonstrate relationships.	
Have students using drawings to locate points. Use a picture of a human body, then boxes or circles, or more complex figures.	
Have students compare their body sizes with an adult and with other students. Have them identify the bigger, smaller, heavier of two. Have them make estimates and then provide means to verify estimates.	Construction paper and scissors Geoboards, dot arrays, graph paper Commercial Geoboard activity card kit such as Cuisenaire or Ideal
Have students find objects in the classroom that are exactly the same size and shape.	HBJ-3, pp. 186-188. HBJ-4, pp. 164-166.
Show students several circles, ask how they are alike (shape), how they are different (size). Explain difference between congruent and similar. Using arrays, geoboards, or graph paper, have students first reproduce congruent or similar shapes. Then have them make pairs of similar or congruent shapes on their own.	HBJ-5, pp. 181-183. HBJ-6, pp. 172-174. HBJ-7, pp. 192-193. HBJ-8, pp. 185-187.

STRAND Geometry

LEARNING Position/Relationship

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Identifies symmetry. M04018 (KY)	1. Recogizes symmetrical figures and objects. 2. Names objects that are symmetrical. 3. Identifies lines of symmetry in simple figures.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide examples or pictures of symmetrical figures and objects.	Origami paper or other paper suitable for folding
Have students find pictures in magazines of symmetrical designs, objects, or figures.	HBJ-2, pp. 119-120.
Model drawing a line of symmetry.	HBJ-3, pp. 184-185.
Provide students with drawings of symmetrical figures; have students draw lines of symmetry.	HBJ-4, pp. 162-163.
Have students make objects using Origami or other paper folding techniques. Select projects that require folding on a line of symmetry.	HBJ-5, pp. 184-185.
Provide pictures of half of a figure; have students complete the drawing.	HBJ-6, p. 175.
	HBJ-7, p. 192.

STRAND Geometry

LEARNING Shape

CRITICAL ATTRIBUTE:

VOCABULARY: plane, solid, construct, triangle, parallel lines, cube, cone, pyramid, cylinder, rectangular prism

OBJECTIVE	TASK ANALYSIS
Describes plane geometric shapes. (K:M; K:#) M01013 (KY) M02017 (KY) M06011 (KY) KM C Geometry & Symbols 1-7 PIAT 1 Math 41, 68	1. Matches basic, plane, geometric shapes to names. 2. Labels basic shapes. 3. Describes characteristics of the following: rectangle, square, triangle, teacher selected shapes, parallel lines, circle.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Name a shape and have student identify it. Point to a shape and have students name it or write its name. Provide definitions and have students construct models. Ask students to give an example of everyday objects that correspond to shapes.	Parquetry blocks Tangrams Templates Geoboards Geoboard Straws Chalkboard Desk tops Windows Ceiling and floor tiles HBJ-1, TE, pp. 120-124. HBJ-2, TE, pp. 114-118, 123, 297. HBJ-3, TE, pp. 179-181. HBJ-4, TE, pp. 156-157. HBJ-5, TE, pp. 176-178. HBJ-6, TE, pp. 163-171. HBJ-7, TE, pp. 182-193. HBJ-8, TE, pp. 173-174, 178, 183-184.

STRAND Geometry

LEARNING Shape

CRITICAL ATTRIBUTE:

VOCABULARY: plane, solid, construct

OBJECTIVE	TASK ANALYSIS
Describes characteristics of basic geometric solids. (1:I; 2-6:M; 2-6:#) M05003 (KY)	1. Matches basic solid figures to names. 2. Labels basic solid figures. 3. Describes characteristics of the following: cube, cone, pyramid, cylinder, rectangular prism, ovoid.
Constructs solid geometric figures. (3-4:I; 5:M; 5:#)	1. Identifies a figure to be constructed. 2. Determines dimensions of the figure. 3. Assembles materials for construction. 4. Constructs solid geometric figures.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
See activities for plane figures. Provide examples from daily life of various solid figures; direct students to describe the figures.	Set of geometric solids Ice cream cones Balls Blocks Pictures of hot water heaters, refrigerators, tree trunks, other solid figures MECC. Elementary, Vol. 9, Diskette #733. (E) San Diego Basic Skills in Math, Vol. 104, Objective 42. (E) HBJ-3, TE, pp. 189-193. HBJ-4, TE, p. 168. HBJ-5, TE, pp. 186-187. HBJ-6, TE, pp. 176-177. HBJ-7, TE, pp. 194-195. HBJ-8, TE, pp. 189-191.
Demonstrates how to make shapes from straws or clay. Provide opportunities for students to construct figures.	HBJ-4, TE, p. 169. HBJ-7, TE, p. 197. HBJ-8, TE, pp. 189-191. Drinking straws Clay or plasticine modeling material Other construction or measurement materials MECC. Elementary, Vol. 3, Diskette #738. (E)

STRAND Geometry

LEARNING Angles

CRITICAL ATTRIBUTE:

VOCABULARY: intersection, right angle, obtuse, acute, protractor, degrees

OBJECTIVE	TASK ANALYSIS
Identifies right angle. (3:I; 4:M) M04006 (KY)	1. Defines intersection.
	2. Uses protractor to measure angles.
	3. Equates 90° with right angle.
	4. Identifies right angles.
Identifies isoceles and obtuse angles. (4-5:I; 6:M) M04007 (KY)	1. Defines acute angle.
	2. Defines obtuse angle.
	3. Identifies isoceles and obtuse angles.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Explain the term intersection and relate it to streets, hallways, and other examples. Explain point of intersection in an angle. Demonstrate use of protractor using enlarged chalkboard protractor. Give definition of right angle. Instruct students to measure right angles found in classroom.	Chalkboard, protractor Clearly marked student protractors MECC. Elementary, Vol. 8, Diskette #732. HBJ-3, TE, pp. 182-183. HBJ-4, TE, p. 153. HBJ-5, TE, pp. 172-173. HBJ-6, p. 159. HBJ-7, pp. 177-178. HBJ-8, p. 176.
Define acute angle and provide examples. Define obtuse angle and provide examples. Bend pipe cleaners to form acute or obtuse angles; have students play "Show Me."	Pictures of roofs, tents, clock hands, scissors MECC. Elemenary, Vol. 9, Diskette #733. HBJ-5, TE, p. 173. HBJ-6, pp. 159, 161. HBJ-7, p. 177. HBJ-8, p. 177.

STRAND Geometry

LEARNING Angles

CRITICAL ATTRIBUTE:

VOCABULARY: intersection, right angle, obtuse, acute, protractor, degrees

OBJECTIVE	TASK ANALYSIS
Draws angles with a protractor. (5:I) M07022 (KY)	1. Draws base line of the angle. 2. Aligns protractor correctly. 3. Matches vertex with center point on protractor. 4. Locates given degree mark. 5. Draws right angle. 6. Draws a given acute angle. 7. Draws a given obtuse angle.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use a chalkboard and protractor or overhead to demonstrate step-by-step drawing of an angle.	Chalkboard and protractor or overhead and transparency protractor
	HBJ-6, TE, p. 161.
Bend pipe cleaners to form acute or obtuse angles; have students play "Show Me."	HBJ-7, TE, p. 176.

STRAND Statistics

LEARNING Graphs

CRITICAL ATTRIBUTE:

VOCABULARY: graphs, pictograph, bar graph, line graph, circle graph

OBJECTIVE	TASK ANALYSIS
Reads simple graphs. (1:I) M04012 (KY) KM L Money 5	1. Reads title. 2. Locates horizontal and vertical axes. 3. Reads specific information from simple pictographs, bar graphs, line graphs, and circle graphs.
Constructs simple graphs (2:I; 3:M) M07016 (KY)	1. Identifies horizontal and vertical axes of a graph. 2. Locates coordinate points on a bar or line graph. 3. Signifies coordinate points on a bar or line graph. 4. Constructs bar graph with given data.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide a variety of graphs and have students locate the title on each. Provide examples of each kind of graph and ask students to find literal data presented.	Books, magazines (U.S. News and World Report, Newsweek, etc.) Opaque projector Murphy, Elaine. Developing Skills with Tables and Graphs. Palo Alto, CA: Dale Seymour Pubs., 1984. (E, M, H) HBJ-3, TE, pp. 283, 298. HBJ-4, TE, pp. 328, 331. HBJ-1, TE, pp. 71-72, 125-126. HBJ-6, TE, pp. 317, 319, 322, 325. HBJ-7, TE, pp. 296, 298, 301, 303-304. HBJ-8, TE, p. 294.
Demonstrate, on overhead or chalkboard, locating horizontal and vertical axes and coordinate points; have students imitate. Provide data and lead students step-by-step in construction of graphs. Direct students to survey classmates on favorite foods, TV shows, birth months, etc; then assist students in determining best graph form and in plotting the data.	Graph paper Chalkboard or overhead projector HBJ-2, TE, pp. 121-122. HBJ-3, TE, pp. 283, 298. HBJ-6, TE, pp. 318, 321. HBJ-7, TE, pp. 297, 300, 302, 304-305. HBJ-8, TE, pp. 296, 299.

STRAND Statistics

LEARNING Graphs

CRITICAL ATTRIBUTE:

VOCABULARY: graphs, pictograph, bar graph, line graph, circle graph

OBJECTIVE	TASK ANALYSIS
Constructs simple graphs (2:I; 3:M) (Continued) M07016 (KY)	5. Constructs line graph with given data. 6. Constructs circle graph with given data. 7. Collects data and constructs graph of own choosing.
Interprets results from graphed information. (2:I; 3-5:R; 6:M; 7-8:#) M05025 (KY) M07015 (KY)	1. Interprets information shown on simple pictograph, bar graph, line graph, and circle graph.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
	HBJ-6, TE, pp. 317, 319-320, 322, 325. HBJ-7, TE, pp. 296, 298-299, 301, 303. HBJ-8, TE, pp. 292-293, 295, 297-298.
Provide examples of various graphs and ask interpretive questions about data presented.	

STRAND Statistics

LEARNING Averages

CRITICAL ATTRIBUTE:

VOCABULARY: average, mean, median, mode

OBJECTIVE	TASK ANALYSIS
Calculates average (mean). (4:I; 5:M) M04016 (KY) M08009 (KY)	1. Relate averages to life situations. 2. States two steps in calculating an average. 3. Calculates averages from given data.
Calculates medians and modes. (4:I; 5:M; 7:M) M08009 (KY) M08010 (KY)	1. Defines median. 2. Defines mode. 3. Calculates median and mode from organized data according to frequency. 4. Calculates median and mode from ungrouped data.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Lead discussion about grade averages, bowling averages, sports statistics, and others. Present the formula for finding an average and demonstrate its application. Provide age-appropriate data and direct students to find averages. Provide related work sheets.	HBJ-5, TE, pp. 140-141. Newspaper Score boxes Calculators HBJ-6, TE, pp. 85-86. HBJ-7, TE, pp. 22, 293. HBJ-8, TE, pp. 25, 290.
Define median and mode. Illustrate concepts using data drawn from real life situations. Provide practice with grouped and ungrouped data.	Overhead, chalkboard Shulte, A. P. Teaching Statistics and Probabilities Yearbook. Reston, VA: NCTM, 1981. (T) Teacher-made work sheets Calculators HBJ-7, TE, pp. 289-292, 295. HBJ-8, TE, pp. 287-288.

STRAND Statistics

LEARNING Averages

CRITICAL ATTRIBUTE:

VOCABULARY: average, mean, median, mode

OBJECTIVE	TASK ANALYSIS
Selects appropriate measure of central tendency to match given situations.	1. Identifies situations for which a measure of central tendency would be appropriate. 2. Identifies problems with the use and interpretation of mean, median, and mode for given sets of data. 3. Selects appropriate measure of central tendency to match given situations.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Identify everyday situations that suggest the use of measures of central tendency.	Overhead Chalkboard
Explain problems with the use and interpretation of mean, median, and mode, e.g., skewedness, precision, ease of calculation.	Overhead Chalkboard
Provide situations from everyday life and request students to select the best measure of central tendency for each situation.	Teacher-prepared work sheets

STRAND Statistics

LEARNING Probability

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Predicts an outcome. M11012 (KY) LSM, M.M. 47-63	1. Identifies known outcomes. 2. Identifies probable outcomes. 3. Distinguishes between known and probable outcomes. 4. Predicts other outcomes and identifies each as known, probable, or unlikely.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Ask students to tell the time for each of the following: school begins; lunch at school; school is out. List them on chalkboard. Let student add to the list. Ask students to predict today's weather, what the main course at dinner will be, and other possibilities. List them on the chalkboard. Direct students to compare events in the first and the second activities according to their predictability.	Chalk Chalkboard Overhead Overhead pen HBJ-6, pp. 328-329. HBJ-7, pp. 306-309. HBJ-8, pp. 302-304, 309-311.

STRAND Statistics

LEARNING Probability

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Writes a fraction expressing the probability that an event will happen. M08011 (KY) LSM, M.M. 47-63	1. Identifies the denominator as the total number of possible outcomes. 2. Identifies the numerator as the number of favorable outcomes. 3. Writes a fraction expressing probability of each event.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Ask students to count the total number of marbles of four different colors using a container and to record the number on the chalkboard/ overhead.	Chalk Chalkboard Overhead Overhead pen Container of marbles Socks (assorted colors) Ribbons (assorted colors) Pasta (assorted shapes) Pencils (assorted colors)
Direct students to count only the marbles of a specified color in a container and record the number as the numerator.	Shultz, Albert, and Choate, Stuart. What Are My Chances? Palo Alto, CA: Creative Publications, 1977. (M, H)
Repeat the above procedure for marbles of each color.	
Use many other items and repeat the preceding two procedures. Have students express the probability fraction in lowest terms.	HBJ-6, pp. 328-329. HBJ-7, pp. 306-309.
Request the students to name the probability before drawing an item from a container.	HBJ-8, pp. 302-304, 309-311.

STRAND Statistics

LEARNING Probability

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Computes probability of single events using a simple counting procedure. LSM, MM 44-63	1. Counts the number of ways an event can happen (number of possible outcomes). 2. Records the number of ways an event can happen. 3. Records outcomes of a given event. 4. Computes outcomes of an event.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Direct the students to count all the chairs in a room. Have the students count all the books on a table and other objects. Have the students record the number of chairs, books, and other objects.	Chairs Books
Request a student to toss a coin 25 times and have another student record how many heads/tails occur out of the 25 tosses. Ask the students to predict the probability of the 26th toss.	Coins What Are My Chances? (M, H) HBJ-6, TE, pp. 328-329. HBJ-7, TE, pp. 306-309. HBJ-8, TE, pp. 302-304, 309-311.

STRAND Functions/Relations

LEARNING Coordinate Graphs

CRITICAL ATTRIBUTE:

VOCABULARY: function, axis, axes, ordered pair, quadrant, origin

OBJECTIVE	TASK ANALYSIS
Writes the ordered pair of numbers of a given point, using Quadrant I of a coordinate graph. M05024 (KY)	1. Determines a rule for a sequence of objects or numbers. 2. Writes ordered pairs from a rule. 3. Identifies function rule for ordered pairs. 4. Identifies x and y axes and origin on a coordinate plane. 5. Identifies Quadrant I. 6. Writes the ordered pair of numbers of a given point in Quadrant I.
Graphs simple equations on Quadrant I. M08013 (KY)	1. Draws Quadrant I. 2. Labels x and y axes and origin. 3. Provides x and y values for a given equation. 4. Graphs (x, 4) values.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Use cubes or blocks to show rule x + 1 = y. Have students explain what is happening in the sequence.	Rand, Ken. Point - Counterpoint. Palo Alto, CA: Creative Publications, 1979. (E, M, H)
Give a rule and have students complete function charts.	Boyle, Pat. Graph Gallery. Creative Publications, 1971. (H)
Show students function charts; have students determine the rule for each.	HBJ-6, TE, p. 327. HBJ-7, TE, p. 361.
Use a flat world map to demonstrate how lines of longitude and latitude are used to locate points.	HBJ-8, TE, p. 253.
Compare equator to horizontal axis. Point out need for point of origin.	
Have class establish a function to graph, for example x (present age) + 5 = y (age 5 years from now). Graph it on the board.	HBJ-7, TE, p. 362. HBJ-8, TE, p. 254.

STRAND Functions/Relations

LEARNING Coordinate Graphs

CRITICAL ATTRIBUTE:

VOCABULARY: function, axis, axes, ordered pair, quadrant, origin

OBJECTIVE	TASK ANALYSIS
Graphs simple equation on the Cartesian Plane. M08008 (KY)	1. Draws co-ordinate plane, labeling (x, y) axes, origin, and four quadrants. 2. Completes (x,y) table for equation. 3. Locates various points from ordered pairs using various combinations of positive and negative integers. 4. Graphs ordered pairs.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Ask students to graph on a duplicated grid five given points. Label them A-E. Have students exchange graphs and write the co-ordinate of each point on the graph.	
Provide rulers for students to help them locate accurately points for ordered pairs.	Rulers HBJ-7, TE, p. 363. HBJ-8, TE, pp. 254-257.

STRAND Computer Literacy

LEARNING Computer Awareness

CRITICAL ATTRIBUTE:

VOCABULARY: computer, Turtle graphics, rotation, programming, software, hardware, bytes, flow charts, Logo

OBJECTIVE	TASK ANALYSIS
Identifies parts of a computer. (3:I)	1. Identifies various computers. 2. Identifies all keys and functions on a computer. 3. Identifies remaining major parts of a computer.
Identifies uses of computers in daily living. (9:R)	1. Identifies uses of computers in an office. 2. Identifies uses of computers in retail businesses. 3. Identifies uses of computers in the home.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide concrete or printed material on various models of computers. Provide a model computer keyboard. Provide models and identify all parts of the computer; have students identify or label.	Bitter, Gary. Exploring with Computers. New York: Julian Messner, 1983. (E, M,) D'Ignacio, Fred. Katie and the Computer. Oaklawn, IL: Ideal, 1979. (E) Rice, Jean. My Friend the Computer. Minneapolis, MN: T. S. Denison, 1981. (E, M, H) _____. Computers Are Fun. (E) Smith, Brian. Hayes-Usborne Guide to Computers. Tulsa, OK: Hayes-Usborne, 1981. (M, H) Kit: Computer Literacy: An Introductory Course. (M, H)
Provide verbal or visual information on office computer use. Provide verbal or visual information on retail business computer use. Provide verbal or visual information on computers in the home.	Ads, catalogues, field trips

STRAND Computer Literacy

LEARNING Computer Awareness

CRITICAL ATTRIBUTE:

VOCABULARY: computer, Turtle graphics, rotation, programming, software, hardware, bytes, flow charts, Logo

OBJECTIVE	TASK ANALYSIS
Identifies manufactured computer-related products.	1. Identifies features of computer hardware. 2. Identifies features of computer software. 3. Identifies features and uses of computer peripherals.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Provide verbal or visual information on hardware (e.g., bytes).	Ads, catalogues, field trips
Provide information on software.	MECC. The Friendly Computer, Diskette #779. (E)
Discuss or demonstrate peripherals, e.g., CRTs, voice synthesizers, printers, modems, adapted keyboards.	

STRAND Computer Literacy

LEARNING Programming

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Runs a pre-programmed program on the computer. (1:I)	1. Places diskette in disk drive. 2. Runs program.
Uses Turtle graphics to make rotations. (2:I)	1. Identifies Logo Turtle (sprite).
Uses Logo to solve problems. (3:I)	1. Identifies Logo problems. 2. Uses basic statement PRINT. 3. Uses basic statement GOTO.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate placement of disk; have students imitate.	Bamble Games. Creative Publications, n.d. (E)
Demonstrate running program; have students imitate.	Bamble Plot. Creative Publications, n.d. (E, M,)
	Rocky's Boots. (E, M)
	Willis, Jerry. The Peanut Butter & Jelly Guide to Computers. Beaverton, OR: Dilithium Press, n.d. (M, H)
Have students take turns being the Turtle and following others' directions (e.g., FORWARD 10) by walking in the classroom.	Software: Apple Logo. (E, M, H)
Demonstrate materials. Model and provide practice.	Disk Operating Systems (M, H)
	Bearden, Donna. 1, 2, 3 My Computer and Me: A Logo Funbook for Kids. Englewood Cliffs, NJ: Reston Publishing Co., 1983. (E, M)

STRAND Pre-Algebra

LEARNING Positive and Negative Numbers

CRITICAL ATTRIBUTE:

VOCABULARY: integers, positive, negative, equation

OBJECTIVE	TASK ANALYSIS
Locates positive and negative numbers on a number line. (8:I; 9:R) M07004 (KY) M07017 (KY) M07018 (KY) M07019 (KY) M07005 (KY)	1. Identifies opposites of given words. 2. Defines an integer. 3. Locates zero on a number line. 4. Locates a positive integer on a number line and then finds the corresponding negative integer.
Computes integers with like signs. (8:I; 9:R) M08002 (KY)	1. Adds integers with like signs. 2. Subtracts integers with like signs. 3. Multiplies integers with like signs. 4. Divides integers with like signs.

KEY: (I) Introduced (R) Reinforced
(#) Assessed by CTBS (M) Mastered
(KY) Assessed by KEST

ACTIVITIES	MATERIALS
Provide words and ask students to give opposites. Example: spring-fall, up-down, left-right, etc.	Picture assortment of items that are opposite, e.g., night-day
Provide a definition of the term integer and discuss with students.	Overhead, chalkboard
Locate zero on a number line; have students imitate.	Number line
	HBJ-6, TE, p. 324.
Lead students to realize that positive and negative numbers are equidistant from zero.	HBJ-7, TE, pp. 341-343.
	HBJ-8, TE, pp. 235-237.
Explain and provide work sheets of computation of integers with like signs.	Swienciki, Lawrence. Adventures with Arithmetic--Algebra Book IV. Palo Alto, CA: Creative Publications, 1974. (M, H)
	Working with Numbers--Algebra. (M, H)
	Mathematics in Daily Living--Algebra Book 4. (M, H)
	Boyle, Pat, and Juarez, Bill. Accent on Algebra. Creative Publications, 1977. (M, H)
	HBJ-6, TE, p. 326.
	HBJ-7, TE, pp. 346, 351, 355, 358.
	HBJ-8, TE, pp. 238, 244.

STRAND Pre-Algebra

LEARNING Positive and Negative Numbers

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Computes integers with unlike signs. (8:I; 9:R) M08002 (KY)	1. Adds integers with unlike signs. 2. Subtracts integers with unlike signs. 3. Multiplies integers with unlike signs. 4. Divides integers with unlike signs.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

220

ACTIVITIES	MATERIALS
Explain and provide work sheets on integers with unlike signs.	Adventures with Arithmetic--Algebra Book IV. (M, H) Working with Numbers--Algebra. (M, H) Mathematics in Daily Living Book--Algebra Book 4. (M, H) Accent on Algebra. (M, H) HBJ-6, TE, p. 326. HBJ-7, TE, pp. 254, 256-257, 259, 347-349, 351. HBJ-8, TE, pp. 239-243, 245, 247.

STRAND Pre Algebra

LEARNING Equations

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Solves an equation of this format and proves: $x - 2 = 4$. (M:8; 8:#) KM I numerical reasoning 3-10	1. Defines variable. 2. Solves linear equations for the value of an unknown; for example, $3 + 5 = x$. 3. Solves an equation of this format and proves: $x + 2 = 4$.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Identify and define a variable; use overhead/chalkboard.	Overhead/chalkboard
Provide work sheets that identify a variable in a simple equation.	Adventures with Arithmetic, Algebra Book IV. (M, H)
Demonstrate solving for an unknown.	Working with Numbers--Algebra. (M, H)
Provide work sheets solving for the value of an unknown.	Mathematics in Daily Living, Algebra Book IV. (M, H)
Demonstrate solving an equation of this format (x + 2 = 4); have students repeat the steps.	Accent on Algebra. (M, H)
Provide work sheets for solving problems in this format (x + 2 = 4).	HBJ-7, TE, pp. 202, 205, 207-209.
Demonstrate process for proving answers derived in this type of equation. Have students prove all their answers.	HBJ-8, TE, pp. 146-148.

STRAND Pre-Algebra

LEARNING Equations

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Solves an equation of this format and proves: $2x + 4 = 16$ (8:M; 8:#)	1. Identifies the coefficient, the variable, and the operation.
	2. Removes the coefficient from a variable.
	3. Solves simple equations of this format and proves: $2x = 4$.
	4. Solves equation of this format and proves: $2x + 4 = 16$.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Identify on an overhead/chalkboard the coefficient and the variable; demonstrate that the operation is multiplication; have students imitate.	Chalkboard/overhead
Provide work sheets with equations in which the student will identify he coefficient and the variable.	Adventures with Arithmetic, Algebra Book IV. (M, H)
Demonstrate removing a coefficient from a variable.	Working with Numbers--Algebra. (M, H)
Provide work sheets where the student removes the coefficient from the variable.	Mathematics in Daily Living, Algebra Book 4. (M, H)
Demonstrate solving this format ($2x = 4$); let students solve for unknown.	Accent on Algebra. (M, H)
Demonstrate solving this format ($2x + 4 = 16$).	HBJ-7, TE, pp. 203-204, 206-207, 210-211.
Provide work sheets of equations for students to solve and prove.	HBJ-8, TE, pp. 147, 152-155.

STRAND Pre-Algebra

LEARNING Equations

CRITICAL ATTRIBUTE:

VOCABULARY:

OBJECTIVE	TASK ANALYSIS
Formulates the equation for a given word problem. (8:M)	1. Identifies all the steps needed to solve a given word problem.
	2. Formulates an equation for a given word problem.

KEY: (I) Introduced
(#) Assessed by CTBS
(KY) Assessed by KEST
(R) Reinforced
(M) Mastered

ACTIVITIES	MATERIALS
Demonstrate on a chalkboard or overhead how to identify all the information needed to solve a given problem; ask students to identify verbally steps to solve problems.	Chalkboard or overhead
Provide work sheets on identification of steps needed to solve a given word problem.	Teacher-made work sheets HBJ-7, TE, pp. 208-209.
Demonstrate formulating an equation for a given word problem.	HBJ-8, TE, pp. 149-151, 156-158.
Provide a word problem and three possible equations; have students determine which equation would yield the answer to the problem.	
Provide work sheets of word problems.	Refer to previously listed pre-Algebra materials.
Request students to work as teams to complete work sheets. Award points for accuracy and speed.	

ESSENTIAL SKILLS
MATHEMATICS

KINDERGARTEN

The student will:

M00001 Count objects from 1 to 10.

M00002 Match sets with numbers (not to exceed 10).

M00003 Determine which one of two sets is larger, smaller, or the same as another set.

M00004 Group objects according to similarities.

M00005 Identify an object different from a group.

M00006 Determine the spatial relationships of two objects (e.g., whether one object is over, under, inside, or outside another).

M00007 Determine which of three objects is between two others.

M00008 Recognize that a clock is used to tell time.

M00009 Determine which of two objects is longer, shorter, or the same as the other.

M00010 Recognize that a calendar is used to measure time.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 1

The student will:

M01001 Count by (Recognize a sequence) 1's to 100.

M01002 Match sets with numbers (not to exceed 20).

M01003 Add two 1-digit numbers (sum no greater than 10) including oral story problems.

M01004 Subtract two 1-digit numbers (minuend no greater than 10) including oral story problems.

M01005 Name (Identify) common coins and bills (1¢, 5¢, 10¢, 25¢, $1.00).

M01006 Determine size relationships of two objects (e.g., which is taller, shorter, longer, wider, smaller, larger).

M01007 Count by (Recognize a sequence) 2's to 20.

M01008 Find a number 1-10 on a number line.

M01009 Count by (Recognize a sequence) 10's to 100.

M01010 Write numerals 1-20.*

M01011 Measure in arbitrary linear units (not to exceed 10).

M01012 Determine which of two identical containers have less, more, or the same amount.

M01013 Tell time to hour and ½ hour using both traditional and digital clocks.

M01014 Identify circles, squares, rectangles, and triangles.

M01015 Recognize number words one through ten.

*Not measured by multiple-choice test

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 2

The student will:

M02001 Identify the number which corresponds to a point on a number line (Whole numbers less than 100).

M02002 Write the correct numeral for any whole number less than 100.

M02003 Apply the commutative property of addition.

M02004 Apply the properties of 0 in adding and subtracting.

M02005 Solve one-step story problems using addition or subtraction (one-digit).

M02006 Identify the smaller or the larger of any two whole numbers less than 100.

M02007 Given three rectangles or squares and their dimensions (or volumes of cubes or spheres**), place them in order from larger to smaller or vice versa.

M02008 Identify points inside, outside, or on a closed figure.

M02009 Measure in inches or centimeters.

M02010 Measure arbitrary units of volume.

M02011 Recognize plane objects with the same basic shape.

M02012 Count by 5's to 50 (Recognize a sequence).

M02013 Recognize patterns in an arithmetic sequence (e.g., 2, 5, 8...).*

M02014 Tell time to ¼ hour or in 15-minute segments using a traditional clock.

M02015 Add two 2-digit numbers without regrouping.

M02016 Subtract 2-digit numbers without regrouping.

M02017 Name circles, squares, rectangles, and triangles.

*Not measured by multiple-choice test
**Not to be tested at this time

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 3

The student will:

M03001 Count by (Recognize a sequence) 1's, 2's, 5's, and 10's to 100.

M03002 Add three-digit numbers without regrouping including story problems.

M03003 Subtract two-digit numbers without regrouping including story problems.

M03004 Multiply two one-digit numbers, including story problems.

M03005 Identify the value of a combination of coins and bills up to $2.00.

M03006 Tell time using a traditional clock and a digital clock (e.g., 2:50 means 10 til 3).

M03007 Identify ordinal numbers through 20.

M03008 Identify the place value of each digit in a three-digit number.

M03009 Measure in inches, feet, yards, centimeters, or meters.

M03010 Measure in pounds or kilograms; cups or liters.

M03011 Estimate length to the nearest inch, foot, centimeter, or meter (not to exceed five units).

M03012 Identify ¼, ⅓, ½ of shaded figures.

M03013 Identify the word-name for 3-digit numbers or vice versa.

M03014 Read a calendar (e.g., On what day of the week does Christmas fall? What is one week from June 23?).

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 4

The student will:

M04001 Add any two whole numbers of no more than 3 digits each.

M04002 Subtract any two whole numbers of no more than 3 digits each. (Subtrahends must be smaller than minuends.)

M04003 Multiply a two-digit number by a one-digit number.

M04004 Divide a two-digit number by a one-digit number using basic multiplication and division facts.

M04005 Identify fractional parts of sets, objects, or areas.

M04006 Identify relationships between points, lines, segments, or angles (e.g., Which point is on both line a and line b?).

M04007 Determine whether an angle is larger or smaller than another (angles not to exceed 180°).

M04008 Solve one-step story problems using addition, subtraction, multiplication, or division (observe same limitations as in #1-4).

M04009 Measure a line segment to the nearest whole unit.

M04010 Estimate capacity to nearest cup or liter (not to exceed 3).

M04011 Count the value of coins and bills up to $5.00.

M04012 Answer a specific question relevant to a pictograph or bar graph.

M04013 Given pictures of two unit fractions (1/4, 1/3, 1/2, 1/5, 1/10), determine which is larger or smaller.

M04014 Find the perimeter of squares and rectangles drawn on graph paper. (Sides must be whole units in length.)

M04015 Find the area of squares and rectangles drawn on graph paper. (Sides must be whole units in length.)

M04016 Find the average of a set of numbers (not to exceed five 1-digit numbers).

M04017 Use >, <, = to order any two whole numbers.

MATHEMATICS

GRADE 4, continued

M04018 Identify lines of symmetry in simple figures.

M04019 Round numbers to the nearest 10 or 100.

M04020 Identify the correct operation needed to solve a one-step story problem.

M04021 Inspect all results and determine the reasonableness in terms of the original problem.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 5

The student will:

M05001 Estimate the answer to a computation problem.

M05002 Estimate the answer to a one-step story problem.

M05003 Identify characteristics of cubes, cones, cylinders, or spheres (e.g., Which of these figures has six sides all of which are equal?).

M05004 Read numbers through millions.

M05005 Select the number corresponding a word-name.

M05006 Identify equivalent fractions (e.g., Which two fractions in a set are equivalent?).

M05007 Write (Select) fractions in their simplest form.

M05008 Add fractions or mixed numbers with like denominators.

M05009 Subtract fractions or mixed numbers with like denominators.

M05010 Find the approximate area of polygons and circles by counting unit squares or by using a grid.

M05011 Determine by physical comparison which of several objects is heaviest or lightest.*

M05012 Identify the Celsius temperatures of water freezing, normal human temperature, or water boiling.

M05013 Identify the Fahrenheit temperatures of water freezing, normal human temperature, or water boiling.

M05014 Make estimations relative to the benchmarks listed in #12 and #13.

M05015 Read a Celsius or Fahrenheit thermometer correct to the nearest unit marked.

*Not to be tested at this time

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

MATHEMATICS

GRADE 5, continued

M05016 Identify a point on a number line relating to a given fraction (e.g., halves, thirds, quarters, fifths).

M05017 Find decimals to tenths on a number line.

M05018 Determine which of two decimals is larger (e.g., tenths, hundredths).

M05019 Measure length to the nearest ½ inch or ¼ inch.

M05020 Measure capacity to the nearest ounce, milliliter, ½ cup, or ¼ cup.

M05021 Identify place value of any digit up to and including millions.

M05022 Add or subtract decimal numbers with no more than 2 decimal places.

M05023 Multiply or divide a decimal number with 2 decimal places by a whole number.

M05024 Identify the whole number coordinates of a given point or identify the point associated with specified whole number coordinates in the first quadrant.

M05025 Summarize data and produce a bar graph or pictograph. (Select the bar graph or pictograph which best illustrates given data.)

ESSENTIAL SKILLS
MATHEMATICS

GRADE 6

The student will:

M06001 Make (Select) a drawing, diagram, or model to illustrate a given problem.

M06002 Identify data relevant to the problem being solved from the statement of the problem (e.g., related materials or documents, past experiences, common knowledge, or experimentation).

M06003 Estimate solutions, check, and use the information so obtained to make a better estimate or better analysis of the problem.

M06004 Give (Identify) the numerical form of a number written in words or vice versa.

M06005 Convert improper fractions to mixed numbers of the reverse.

M06006 Select the equivalent forms of frequently used decimals, fractions, or percents (e.g., ¼, 25%, .25).

M06007 Perform the four basic operations, or a combination of those operations, on whole numbers and decimals. (Without a calculator, use numbers with no more than five digits and divisors of no more than two digits.)

M06008 Solve two-step story problems using a combination of the four basic operations with whole numbers or decimals. (Without a calculator, use numbers with no more than five digits and divisors of no more than two digits.)

M06009 Identify appropriate units to measure length using traditional or metric system.

M06010 Identify appropriate tools to measure length using traditional or metric system.

M06011 Identify by name parallelogram, trapezoid, quadrilateral, rhombus, pentagon, hexagon, or octagon.

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

MATHEMATICS

GRADE 6, continued

M06012 Estimate the length of a given object in either traditional or metric units (not to exceed five units long).

M06013 Measure the length of a given object in either traditional or metric units.

M06014 Find the volume of a rectangular solid by counting unit cubes.

M06015 Identify appropriate units to measure mass (traditional or metric system) (e.g., use grams rather than meters or kilograms to measure a dose of medicine).

M06016 Identify appropriate tools to measure mass (traditional or metric).

M06017 Perform calculations involving money including making change up to $10.

M06018 Perform calculations and conversions with units of time (traditional clock and calendar).

M06019 Find the perimeter of a polygon.

M06020 Add, subtract, multiply, or divide any two fractions or mixed numbers with denominators not to exceed 8.

M06021 Given the formula, find the area of a square or rectangle.

ESSENTIAL SKILLS
MATHEMATICS

GRADE 7

The student will:

M07001 Round off a whole number to a specific place value.

M07002 Identify any whole number less than 100 as prime or composite.

M07003 Find the prime factorization of any whole number less than 100.

M07004 Use signed (+, -) numbers to describe relative position, location, or direction (e.g., elevation, temperature, yardage, or profits).

M07005 Order a set of integers on a number line.

M07006 Find the value of a number squared or cubed.

M07007 Order two fractions.

M07008 Add, subtract, multiply, or divide any two fractions or mixed numbers with denominators not to exceed 12 including word problems.

M07009 Order a set of decimal numbers.

M07010 Add, subtract, or multiply any two decimal numbers.

M07011 Estimate capacity using the most appropriate unit in either the traditional or metric system.

M07012 Identify similar figures.

M07013 Identify congruent figures.

M07014 Perform calculations involving conversions between units within a system (length, capacity, area, volume, mass, time).

M07015 Interpret circle, bar, or line graphs, charts, or tables.

M07016 Construct (Select) a graph, chart, or table to illustrate a given problem.

M07017 Locate points corresponding to any rational number on a number line.

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

MATHEMATICS

GRADE 7, continued

M07018 Find (Identify the point corresponding to) an integer on a number line.

M07019 Determine which of two integers is the smaller or the larger.

M07020 Divide any two decimal numbers (quotient should come out even at no more than the thousandths place).

M07021 Select equivalent forms of frequently used decimals, fractions, or percents (halves, thirds, fourths, fifths, and tenths).

M07022 Use a protractor to measure or draw angles.*

*Not to be tested at this time

ESSENTIAL SKILLS
MATHEMATICS

GRADE 8

The student will:

M08001 Use the order of operations to simplify a numerical expression involving whole numbers.

M08002 Add, subtract, multiply, or divide integers.

M08003 Given any fraction, decimal, or percent, find its equivalent in the other two forms.

M08004 Perform calculations using percents of whole numbers.

M08005 Identify the decimal number represented by a word name.

M08006 Given the appropriate formula, find the circumference of a circle given its radius or diameter.

M08007 Given the appropriate formula, find the area of a square, rectangle, triangle, or a circle.

M08008 Identify the point corresponding to ordered pairs on a Cartesian coordinate system.

M08009 Calculate the mean, median, mode, or range for a set of data.

M08010 Organize data to obtain the frequency of events.

M08011 Identify fractional number of successes out of attempts.

M08012 Use logical quantifiers (all, some, none) correctly.

M08013 Plot figures on first quadrant (Identify coordinates of vertices of a figure).

M08014 Identify the missing information needed to solve a word problem.

M08015 Identify which information in unnecessary to solve a word problem.

M08016 Round decimal numbers to nearest tenths, hundredths, or thousandths.

M08017 Inspect all results and determine the reasonableness in terms of the original problem.

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

ESSENTIAL SKILLS
MATHEMATICS

GRADES 9-10

The student will:

M09001 Solve a given problem by inference from specific cases, patterns, lists, or tables.

M09002 Given a formula and the whole number value of all but one variable, find the value of that variable.

M09003 Solve any of the three basic types of percent problems.

M09004 Solve word problems involving percents.

M09005 Find missing items in numerical or geometric patterns or sequences.

M09006 Use the correct symbol for less than, greater than, equal to, not equal to, less than or equal to, or greater than or equal to, to make a true statement.

M09007 Perform the four basic operations with integers using the correct order of operations.

M09008 Solve word problems for the area of a triangle or simple quadrilateral given the formula and dimensions.

M09009 Solve word problems for the perimeter of a simple plane figure.

M09010 Given the formula, find the volume of a rectangular solid.

M09011 Express (Identify) relationships between pairs of parallel, intersecting, perpendicular, or skew lines in space.

M09012 Solve simple whole number ratio and proportion problems.

M09013 Given an algorithm, predict the outcome.

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

ESSENTIAL SKILLS
MATHEMATICS

GRADES 11-12

The student will:

M11001 Make an inference to obtain additional information about a given problem.

M11002 Identify a similar but simpler problem to determine relationships and a possible general solution technique.

M11003 Given a formula and rational values for all but one variable, find the value of that variable.

M11004 Perform combinations of the four basic operations and parentheses on rational numbers using the correct order of operations.

M11005 Approximate the square root of a whole number up to 100 (e.g., $\overline{)37}$ is between 6 and 7).

M11006 Write (Identify) an equation which correctly represents a given relationship.

M11007 Given the Pythagorean Theorem and a square root chart, find a missing side of a right triangle.

M11008 Given the dimensions of two similar figures, determine the ratio between their areas or perimeters.

M11009 Given the steps in a simple flow chart or algorithm, arrange them in order so as to obtain the specified results.

M11010 Given a set of data, make frequency tables or histograms (Identify the matching table or histograms).

M11011 List (Identify) the total possible outcomes of an event.

M11012 Determine the probability of an event.

M11013 Apply ratio and proportion to map scale and scale drawing problems.

M11014 Apply ratio and proportion to unit cost comparison problems.

Note: Verbs in parentheses indicate the approach which will be used for testing purposes.

APPENDIX

VENDOR'S ADDRESSES

AGS
American Guidance Service, Inc.
Circle Pines, MN 55014-1796

Apple Computers, Inc.
20525 Marioni
Cupertino, CA 95014

Central School Supply Co.
4100 Eastmoor Road
Louisville, KY 40218

Childcraft Education
20 Kilmer Road
Edison, NJ 08818

Continental Press, Inc.
520 E. Bainbridge Street
Elizabethown, PA 17022

Creative Publications
3988 East Bayshore Road
P.O. Box 10328
Palo Alto, CA 94303

Creative Teaching Associates
P.O. Box 7766
Fresno, CA 93747

Cuisenaire of America
12 Church Street
New Rochelle, NY 10805

DLM Teaching Resources
P.O. Box 4000
Allen, TX 75002

Fearon Education
David S. Lake Publishers
19 Davis Drive
Belmont, CA 94002

Hayes Books
4235 South Memorial Drive
Tulsa, OK 74145

J. R. Holcomb Co.
3000 Quigley Road
Cleveland, OH 44113

Hubbard Scientific
P.O. Box 104
Northbrook, IL 60062

Jefferson Office and School Supply
11605 Main Street
Middletown, KY 40243

Kentucky School Supply (KSS)
718 West Main Street
Louisville, KY 40202

Logo Computer Systems
9960 Cote de Liesse
Lachine, Quebec
Canada H8T 1A1

Love Publishing Co.
1777 South Bellaire Street
Denver, CO 80222

Mafex Associates
90 Cherry Street
Box 519
Johnstown, PA 15907

McGraw-Hill Book Co.
1221 Avenue of the Americas
New York, NY 10020

Nasco
901 Janesville Avenue
Fort Atkinson, WI 53538

National Council of Teachers
of Mathematics (NCTM)
1906 Association Drive
Reston, VA 22091

Opportunities for Learning
20417 Nordhoff Street, Dept. 9
Chatsworth, CA 91311

243

Reston Publishing Company, Inc.
Distributed by Prentice-Hall
Englewood Cliffs, NJ 07632

Frank Richards Publishing Co.
P.O. Box 66
Phoenix, NY 13135

Frank Schaffer
26616 Indian Peak Road, Dept. 38
Rancho Palos Verdes, CA 90274

Steck Vaughn
P.O. Box 2028
Austin, TX 78768

RESOURCES

Books

Bitter, Gary. Exploring with Computers. New York: Julian Messner, 1983.

D'Ignacio, Fred. Katie and the Computer. Oaklawn, IL: Ideal, 1979.

Goldberg, Kenneth. Pushbutton Mathematics: Calculator Math Problems. Engelwood Cliffs, NJ: Prentice Hall, 1982.

Greens, Carol. The Mathworks Handbook of Activities for Helping Students Learn Mathematics. Palo Alto, CA: Creative Publications, 1979.

Harmeyer, Kathleen. Mathematics for Consumers. Baltimore, MD: Media Materials, Inc., 1983.

Jacobs, Donald H., and Treff, August. Basic Mathematics Skills. Baltimore, MD: Media Materials, Inc., 1982.

_____. Life Skills Mathematics. Baltimore, MD: Media Materials, Inc., 1983.

Launch: A Handbook of Classroom Ideas to Motivate the Teaching of Preschool and Kindergarten. Stevensville, MN: Educational Service, 1972.

Learning About Time. Palos Verdes Estates, CA: Frank Schaffner Publications, Inc., 1981. Set of 4 Templates.

May, Lola J; Frye, Shirley M; and Jacobs, Donna C. HBJ Mathematics. Levels K-8. New York: Harcourt Brace Jovanovich, 1981.

Murphy, Elaine. Developing Skills with Tables and Graphs. Books A & B. Palo Alto, CA: Dale Seymour Publishers, 1984.

Plus: A Handbook of Classroom Ideas to Motivate the Teaching of Elementary Mathematics. Stevensville, MN: Educational Service, 1975.

Rice, Jean. Computers Are Fun. Minneapolis, MN: T. S. Denison & Co., 1981.

_____. My Friend the Computer. Minneapolis, MN: T. S. Denison & Co., 1981.

Shulte, A. P., ed. Teaching Statistics and Probabilities Yearbook. Reston, VA: National Council of Teachers of Mathematics (N.C.T.M.), 1981.

Shulte, Albert, and Choate, Stuart. What Are My Chances? Books A and B. Palo Alto, CA: Creative Publications, 1977.

Smith, Brian. Hayes-Usborne Guide to Computers. Tulsa, OK: Hayes-Usborne, 1981.

Sullivan Associates. Programmed Math. New York: McGraw Hill Book Co., 1975.

Vold, Kenneth C. Math Mazes. Oaklawn, IL: Ideal, 1972.

_____. Math Puzzlers. Oaklawn, IL: Ideal, 1973.

Willis, Jerry. The Peanut Butter and Jelly Guide to Computers. Beaverton, OR: Dilithium Press, n.d.

Zullie, Matthew. Fractions with Pattern Blocks. Palo Alto, CA: Creative Publications, 1975.

Duplicating Masters

Beede, Rudy, et al. Action Math: Fractions. Grand Rapids, MI: Instructional Fair, 1985.

Engebrecht, Victor. Calculator Activities for Elementary Students. Wilkinsburg, PA: Hayes School Publishers, 1980.

Fraser, Don. Newspaper Math. Palo Alto, CA: Dale Seymour, 1982.

Herlihy, Ruth. Basic Math Drill: Decimal Exercises, Grades 4-6. St. Louis, MO: Milliken Publishing Co., 1978.

_____. Basic Math Drill: Fractions Exercises, Grades 4-6. St. Louis, MO: Milliken Publishing Co., 1978.

Howett, Jerry. Basic Skills in Mathematics: Fractions. Newton, MA: CEBCO Division of Allyn & Bacon, Inc., 1981.

Hozell, B. G. Arithmetic Bingo. Minneapolis, MN: Instructo, 1979.

Judy/Instructo Staff. Basic Math Skills: Place Value and Roman Numerals. Minneapolis, MN: Instructo, 1980.

_____. Math Fun Series. Minneapolis, MN: Instructo, 1978.

_____. Math Games and Activities K-6. Minneapolis, MN: Instructo, 1975.

Marotta, George. Learning the Metric System. Elizabethtown, PA: Continental Press, 1978.

Parteus, Richard. Creative Math. Minneapolis, MN: Instructo, 1980.

_____. Energy Savers Math. Minneapolis, MN: Instructo, 1981.

Seymour, Dale. Developing Skills in Estimation. Books A & B. Palo Alto, CA:
Creative Publications, 1981.

Taylor, F. D. Basic Practice in Subtracting Fractions. Denver, CO: Love Publishing Co., 1981.

Taylor, F. D., et al. Basic Practice in Division. Denver, CO: Love Publishers, 1976.

Tucker, Benny, et al. Mathematics--Grade 6. Grands Rapids, MI: Instructional Fair, 1976.

Zieslinski, Henry. Hayes Geometry. Wilkinsburg, PA: Hayes-Benton, 1968.

Kits, Games, Manipulatives, Cards

Attribute Games and Problem Set. Contains blocks, cubes, people pieces, loops, and guide. Creative Publications.

Bennett, Albert. Decimal Squares. Creative Publications. Contains games, work sheets, manipulatives, and guide.

Bitter, Gary. Getting Ready for Mathematics. DLM. Contains 96 activity cards and teacher's manual.

Coin Dice. 2-inch dice. Holcomb.

Coin Rubber Stamp Set: Heads and Tails. Holcomb.

Computer Literacy: An Introductory Course. Contains activity sheets, transparency, T-guide, and software. Continental Press.

Cook, Marcy. Faxactly Game--Basic Multiplication Facts. Creative Publications. Contains 10 game boards and necessary manipulatives.

Count Your Change Game. Milton Bradley.

Cuisenaire Rods. Contains 74 plastic or wood rods. Cuisenaire Company of America.

Finding Fractions Card Games I & II. DLM.

First Clock. 5" laminated clocks. Holcomb.

Fit-A-Fraction Circles. Opportunities for Learning. Contains 10 circles, fractional pieces, and cards.

Flip and Learn: Time. DLM. Ten 8½" x 11" self-correcting cards.

Fraction Dominoes. Creative Publications. Contains 45 piece domino set and instructions.

Fractions with Pattern Blocks. Creative Publications. Reproducible book with perforated pages.

Greenes, Carole, and Immerzeel, George. Moving Up in Fractions. Allen, TX: DLM Teaching Resources, n.d. Contains teaching cards, exercise cards, answer cards, and teacher's guide.

_____. Moving Up in Decimals. Allen, TX: DLM Teaching Resources, n.d. Contains teaching cards, exercise cards, answer cards, and teacher's guide.

KeyMath Attribute Blocks. AGS. 60 blocks and manual.

KeyMath Balance. AGS. Contains balance, scale pans, 49 KeyMath cubes and manual.

KeyMath Boards. AGS. Contains 4 KeyMath Boards, rubber bands, 4 tumblers, 5 transparencies, 100 cubes, and manual.

KeyMath Card Decks. AGS. 8 decks of color cards plus manual.

KeyMath Chips. AGS. Contains 280 chips plus manual.

KeyMath Early Steps. American Guidance Services (AGS), 1982. Contains activity cards, printed material, manipulatives, and manual.

KeyMath Rulers. AGS. Contains 10 rulers.

Learning About Weather. Marvel. 16 pictures 12" x 17".

Little Professor. Creative Publications. Accompanied by booklet Fun with Math Facts.

Math Big Box. DLM. Contains cubes, templates, puzzles, and number wheels.

Math Desk Squares. Addition/Subtraction, Multiplication/Division. Instructo.

Metric Measuring Package. Nasco P-I.

Metric Posters. Creative Publications. Set of 4, 22" x 34".

Murphy, Donna M. Moving Up in Money I. DLM, 1976.

_____. Moving Up in Money II. DLM, 1981.

Pattern Blocks. Creative Publications. Contains 250 hardwood blocks in 6 different shapes and colors.

Percento. Opportunities for Learning. Contains 6 different Bingo-type games.

Pizza Party. Creative Publications. Contains fractional pizza pieces, 3 spinners, and directions.

Reys, Robert, and Reys, Barbara. Guess: Guide to Using Estimation Skills and Strategies. Boxes 1 & 2. Creative Publications. Contains over 400 cards teaching problem-solving strategies.

Seymour, Dale. Visual Thinking Cards: Elementary and Secondary. Creative Publications.

Show-Me Math. Grades 1-6. Nasco. Contains 30 magic slates, 1 set cards, questions and answer cards.

Spanga, Francis. Get Set for Calculator Math. Mafex. Contains workbooks, cassette, test, and teacher's guide.

Sum Clown. DLM.

Telling Time Bingo. Holcomb. 36 playing boards, markers, T-card.

Telling Time. Hubbard. Contains duplicating masters, numeral blocks, game, clock and accessories, and teacher's guide.

The Judy Clock. 14" hardwood clock. Holcomb.

TOPS: Techniques of Problem-Solving. Creative Publications. 8 decks of problem-solving cards (200 cards each).

Software

Apple Logo, Logo Computer Systems, 1982.

Bamble Games, Creative Publications.

Bamble Plot, Creative Publications.

MECC--Minnesota Educational Computing Consortium
2520 Broadway Drive
St. Paul, MN 55113

Elementary Volume 1: Diskette #702, MECC, 1980.
Elementary Volume 1: Diskette #705, MECC, 1980.
Elementary Volume 1: Diskette #706, MECC, 1980.
Elementary Volume 8: Diskette #732, MECC, 1981.
Elementary Volume 9: Diskette #733, MECC, 1981.
Elementary Volume 10: Diskette #737, MECC, 1981.
Elementary Volume 3: Diskette #738, MECC, 1981.
The Friendly Computer: Diskette #779, MECC, 1983.

Rocky's Boots, Creative Publications, p. 71.

San Diego Basic Skills in Math
San Diego Unified School District
Education Center
4100 Normal Street
San Diego, CA 92103

Micro Computer Software 0:1, Volume 1, Objective 2.
Micro Computer Software 0:3, Volume 2, Objective 14.
Micro Computer Software 0:1, Volume 2, Objectives 15-18.
Micro Computer Software 0:2, Volume 10, Objective 93.
Micro Computer Software 0:3, Volume 1, Objectives 5-9.
Micro Computer Software 0:3, Volume 2, Objective 13.
Micro Computer Software 0:1, Volume 1, Objective 12.
Micro Computer Software 0:3, Volume 1, Objectives 3-4.
Micro Computer Software 0:1-2, Volume 3, Objectives 26-28.
Micro Computer Software 0:1-2, Volume 4, Objectives 29, 33.
Micro Computer Software 0:2, Volume 4, Objectives 36-38, 40.
Micro Computer Software 0:3, Volumes 4-5, Objectives 39, 41-50.
Micro Computer Software 0:2, Volumes 5-6, Objectives 53, 65.
Micro Computer Software 0:3, Volumes 7-8, Objectives 68-74.
Micro Computer Software 0:3, Volume 8, Objective 86.
Micro Computer Software 0:3, Volume 10, Objectives 96-97.
Micro Computer Software 0:2, Volume 17, Objectives 164, 166.
Micro Computer Software 0:3, Volume 18, Objective 167.
Micro Computer Software 0:1, Volume 100, Objectives 2, 4, 6.
Micro Computer Software 0:1, Volume 10, Objectives 98-99.
Micro Computer Software 0:3, Volumes 11-12, Objectives 106-116.
Micro Computer Software 0:2, Volume 18, Objectives 170-173.
Micro Computer Software 0:1, Volume 13, Objectives 121-122.
Micro Computer Software 0:3, Volume 13, Objectives 123-126.
Micro Computer Software 0:3, Volume 14, Objectives 129-131.
Micro Computer Software 0:2, Volumes 18-19, Objectives 177-180.
Micro Computer Software 0:1, Volume 14, Objective 134.
Micro Computer Software 0:4, Volume 15, Objectives 137-142.
Micro Computer Software 0:2, Volumes 19-20, Objectives 184-189.
Micro Computer Software 0:1, Volume 15, Objective 145.
Micro Computer Software 0:2, Volume 20, Objectives 193-199.
Micro Computer Software 0:3, Volume 16, Objectives 149-155.
Micro Computer Software 0:2-3, Volume 104, Objective 41.
Micro Computer Software 0:1, Volume 104, Objective 39.
Micro Computer Software 0:1, Volume 103, Objectives 33-36.
Micro Computer Software 0:3, Volume 103, Objective 37.
Micro Computer Software 0:1-3, Volume 103, Objective 38.
Micro Computer Software 0:1, Volume 104, Objective 42.

San Diego Math--MECC (Extras)

Micro Computer Software 0:3, Volume 4, Objectives 29-33.
Micro Computer Software 0:3, Volumes 5-6, Objectives 56, 58-59, 62-65.
Micro Computer Software 0:2, Volume 7, Objectives 68-74.
Micro Computer Software 0:3, Volume 10, Objective 97.
Micro Computer Software 0:2, Volume 100, Objective 6.
Micro Computer Software 0:1, Volumes 11-12, Objectives 106-108, 112-113.
Micro Computer Software 0:3, Volume 11, Objective 111.
Micro Computer Software 0:3, Volume 13, Objective 125.
Micro Computer Software 0:3, Volume 13, Objective 126.
Micro Computer Software 0:3, Volume 15, Objective 137.
Micro Computer Software 0:5, Volume 15, Objective 140.
Micro Computer Software 0:6, Volume 15, Objectives 141-142.
Micro Computer Software 0:1-3, Diskette #779, The Friendly Keyboard, Programs 1-3.
Micro Computer Software 0:1-3, Diskette #738, Elementary Volume 3, Program 1 (Geometric Shapes).
Micro Computer Software 0:1-2, Diskette #738, Elementary Volume 3, Program 3 (Rectangle & Square Areas).
Micro Computer Software 0:3, Diskette #738, Elementary Volume 3, Program 2 (Perimeters).
Micro Computer Software 0:1, Diskette #737, Elementary Volume 10, Program 5 (Measurement/English Units).
Micro Computer Software 0:1, Diskette #737, Elementary Volume 10, Program 3 (Measurement).
Micro Computer Software 0:1, Diskette #737, Elementary Volume 10, Programs 1-2 (Measurement/English Units).
Micro Computer Software 0:1-3, Diskette #737, Elementary Volume 10, Program 4 (Time/Calendar).
Micro Computer Software 0:1, Diskette #733, Elementary Volume 9, Program 2 (Angles).
Micro Computer Software 0:1, Diskette #733, Elementary Volume 9, Program 1 (Intersections).
Micro Computer Software 0:1, Diskette #733, Elementary Volume 9, Programs 3-4 (Triangles).
Micro Computer Software 0:2, Diskette #732, Elementary Volume 8, Programs 3-4 (Angles).
Micro Computer Software 0:1-2, Diskette #706, Elementary Volume I, Program 1.
Micro Computer Software 0:1-2, Diskette #706, Elementary Volume I, Program 2 (Making Change).
Micro Computer Software 0:2, Diskette #706, Elementary Volume I, Program 1 (Multiplying with Zeros in Number).
Micro Computer Software 0:2, Diskette #705, Elementary Volume I, Program 2 (Division).
Micro Computer Software 0:2, Diskette #705, Elementary Volume I, Program 2 (Multiplication).
Micro Computer Software 0:2, Diskette #705, Elementary Volume I, Program 2 (Addition).

Micro Computer Software 0:2, Diskette #705, Elementary Volume I, Program 2 (Subtraction).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 9 (Division).
Micro Computer Software 0:3, Diskette #702, Elementary Volume I, Program 9 (Subtraction).
Micro Computer Software 0:2-3, Diskette #702, Elementary Volume I, Program 9 (Multiplication).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 11 (Multiplying with Numbers Using Zeros).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 6 (Centimeters).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 4 (Estimation Using Metric Units).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 9 (Addition).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 5 (Metric Conversion).
Micro Computer Software 0:2, Diskette #702, Elementary Volume I, Program 10 (Factoring).

Workbooks

Bearden, Donna. 1, 2, 3 My Computer and Me: A Logo Funbook for Kids. Englewood Cliffs, NJ: Reston Publishing Co., 1983.

Boyle, Pat. Graph Gallery. Palo Alto, CA: Creative Publications, 1971.

Boyle, Pat, and Juarez, Bill. Accent on Algebra. Rev. ed. Palo Alto, CA: Creative Publications, 1977.

Bryant, Nerissa, and Hedgpath, Loy. Mathematics in Daily Living Series. Austin, TX: Steck-Vaughn, 1978.

Fair, Jan. Electric Drill--Whole Numbers. Palo Alto, CA: Creative Publications, 1977.

_____. Electric Drill--Fractions. Palo Alto, CA: Creative Publications, 1977.

Gallery, Michael. Money Matters: Learning the Calculator. Allen, TX: DLM. o.p.*

*The abbreviation o.p. following an entry means that the item is not currently available for purchase. Many school and public libraries, however, already have copies of these materials.

Greenes, Carol, et al. TOPS Developmental Workbooks Series. Palo Alto, CA: Dale Seymour Publishers, 1980.

Herlihy, Ruth. Math Workbook, Fractions. St. Louis, MO: Milliken Publishing Co., 1980, available from KSS.

Hilliard, Fultra. All About Fractions. Johnstown, PA: Mafex, 1972.

Howett, Jerry. Basic Skills in Mathematics. Unit 1, Fractions. Newton, MA: CEBCO Division of Allyn & Bacon, Inc., 1981.

Immerzeel, George, and Ockenga, Earl. Calculator Activities for the Classroom. Books 1 & 2. Palo Alto, CA: Creative Publications, 1977.

Kahn, Charles, and Bradley, J. Hanna. Working Makes Sense. 2d ed. Fearon Education. Pacemaker Practical Arithmetic Series. Belmont, CA: David S. Lake Publishers, 1983.

_____. Money Makes Sense. 3d ed. Fearon Education. Pacemaker Practical Arithmetic Series. Belmont, CA: David S. Lake Publishers, 1983.

_____. Using Dollars and Sense. 3d ed. Fearon Education. Pacemaker Practical Arithmetic Series. Belmont, CA: David S. Lake Publishers, 1983.

Keystrokes: Calculator Activities for Young Students. Palo Alto, CA: Creative Publications, 1979.

King, Carol. Buying with Sense. Fearon Education. Pacemaker Practical Arithmetic Series. Belmont, CA: David S. Lake Publishers, 1980.

Lund, Charles. Dot Paper Geometry with or Without a Geoboard. Baldwin, NY: Activity Records, Inc., n.d.

Marcy, Steve, and Marcy, Janis. Mathimagination. Books A-F. Palo Alto, CA: Creative Publications, 1973.

Miller, Don. Calculator Explorations and Problems. New Rochelle, NY: Cuisenaire Company of America, 1980.

Piltch, Benjamin. Find the Right Number. Phoenix, NY: Frank Richards, Co., 1983.

Quinn, Treva. Grocery Bills. Johnstown, PA: Mafex, 1979.

Rand, Ken. Point Counterpoint. Palo Alto, CA: Creative Publications, 1979.

Ryder, Ruth, et al. Pacemaker Arithmetic Program, Levels A-F. (6 books) Belmont, CA: David S. Lake, Publishers, 1971-1974.

Shea, James, et al. Working with Numbers Series. Austin, TX: Steck-Vaughn, 1983.

Smith, Gale. Modern Mastery Drills in Arithmetic, Grades 2-8. Wilkinsburg, PA: Hayes School Publishing Co., Inc., 1975.

Swienciki, Lawrence. Adventures with Arithmetic--Algebra Book IV. Palo Alto, CA: Creative Publications, 1974.

Vervoort, Gerardus. Beginning Calculator Math. Fearon Education. Basic Mathematics Resource Pack. Belmont, CA: David S. Lake Publishers, 1980.

Wool, John. Using Money Series. Phoenix, NY: Frank Richards, 1982.

Yeager, David. Mystery Story Problems. Palo Alto, CA: Creative Publications, 1981.

_____. Story Problems Series. Palo Alto, CA: Creative Publications, 1983. (Includes Fraction Story Problems, Decimal Story Problems, and Percent Story Problems.)

Zanzirs, Gene. Working with Money. Hamden, CT: Learning Systems Corp., 1979.

CITIZEN'S REQUEST FOR REVIEW AND REEVALUATION OF INSTRUCTIONAL MATERIALS

The Jefferson County Board of Education endeavors to meet the needs of all its students by providing on all levels a wide range of instructional materials having diversity of appeal and different points of view. With respect to instructional materials, the Board supports the principles of intellectual freedom inherent in the First Amendment to the *Constitution of the United States* and in the *Library Bill of Rights and the Students' Right to Read* of the National Council of the Teachers of English.

The Board also recognizes that, despite the quality of instructional materials or the credibility of the process used for selecting instructional materials, occasional objections will arise. Therefore, in order to facilitate the resolution of any concerns related to instructional materials, the Board provides the following procedure for review and reevaluation.

Level I—Initial Concern

1. A person having a complaint related to instructional materials states the complaint to a local school principal or unit head or a designee.

2. The school official to whom the complaint is stated schedules a conference with the complainant to discuss the instructional materials.

3. The complainant and the school official discuss the instructional materials during the scheduled conference.

4. Within five (5) business days following the conference, the school official provides the complainant a written decision concerning the complaint.

Level II—Written Request for Review and Reevaluation

1. If a complainant is not satisfied with the school official's decision at Level I, the school official will assist the complainant in filing, with the Superintendent, a written request for review and reevaluation of the instructional materials.

2. The Superintendent accepts the written request for review and reevaluation of instructional materials with the purpose of rendering a decision concerning the complaint. (When appropriate, the Superintendent forwards the request to the Reconsideration Committee.)

3. When requested by the Superintendent, the Reconsideration Committee meets for purpose of formulating a recommendation to the Superintendent concerning the instructional materials.

4. Within twenty-five (25) business days of receiving the written request for review and reevaluation of the instructional materials, the Superintendent notifies, in writing, the complainant concerning disposition of the complaint.

Level III—Appeal

1. In the event the complainant is not satisfied with the Superintendent's decision regarding the instructional materials, the complainant may file with the Jefferson County Board of Education written request for the review of the complaint.

2. Within forty-five (45) business days of receiving the request the Board will notify the complainant of its decision.

Note: The Board considers appeals requesting the view of decisions related to the use of instructional materials to be serious matters. Therefore, person requesting such reviews are advised to present carefully documented, factual information substantiating their claims.

Only upon recommendation of the Superintendent shall access to challenged instructional materials be restricted during the reconsideration process.

REQUEST FOR RECONSIDERATION OF INSTRUCTIONAL MATERIALS

School _____

Please check type of material:

( ) Book	( ) Film	( ) Record
( ) Periodical	( ) Filmstrip	( ) Kit
( ) Pamphlet	( ) Cassette	( ) Other

Title _____

Author _____

Publisher or Producer _____

Request initiated by _____

Telephone _____ Address _____

City _____ State _____ Zip _____

The following questions are to be answered after the complainant has read, viewed, or listened to the school library material in its entirety. If sufficient space is not provided, attach additional sheets. (Please sign your name to each additional attachment.)

1. To what in the material do you object? (Please be specific. Cite pages, frames in a filmstrip, film sequence, et cetera.)

_____

_____

_____

_____

_____

2. What do you believe is the theme or purpose of this material?

_____

_____

_____

_____

_____

_____

3. What do you feel might be the result of a student using this material?

4. For what age group would you recommend this material?

5. Is there anything good in this material? Please comment.

6. Would you care to recommend other instructional material of the same subject and format?

Signature of Complainant

Date

Please return completed form to the school principal.

9/82